

- (ii) If a written report is received within the time prescribed in paragraph (f)(1)(i), the Secretary will review this report before determining whether a certification is false or inaccurate. If a report is not received within 15 days from the receipt of the Secretary's notice, the Secretary will make the determination on the basis of the information presented.
- (iii) If the Secretary determines that a certification is false or inaccurate, the manufacturer will be given written notice and the reasons for this determination by certified mail.

(2) The Secretary may seek civil and criminal penalties provided for in section 611 of the Act, 42 U.S.C. 5410, if the party in question in the exercise of due care has reason to know that such certification is false or misleading as to any material fact.

(Sections 604(h) and 625 of the National Mobile Home Construction and Safety Standards Act of 1974, 42 USC 5403 and 5424, and Section 7(d), Department of HUD Act, 42 USC 3535(d).)

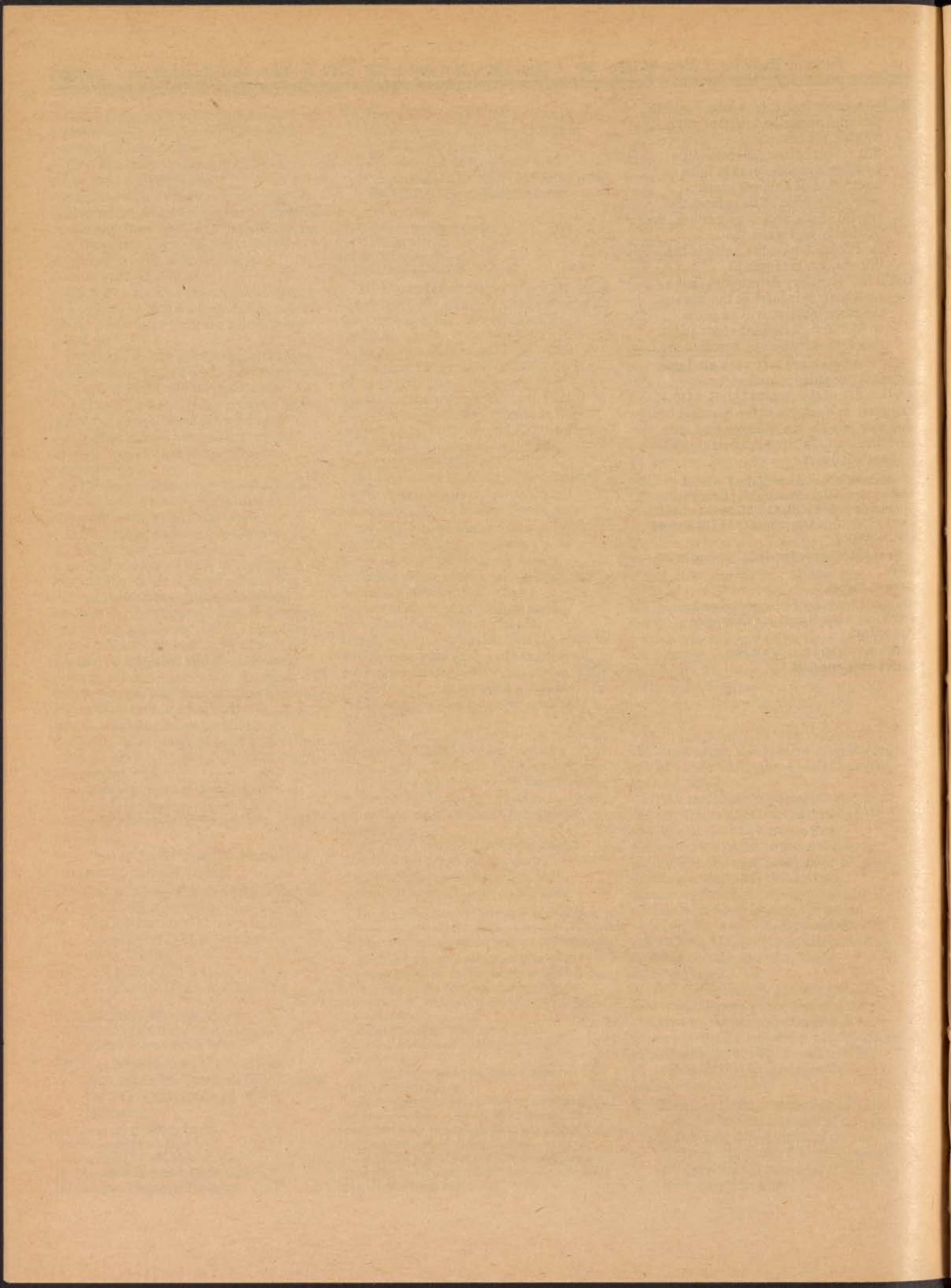
Issued at Washington, D.C., November 20, 1979.

Geno C. Baroni,

*Assistant Secretary for Neighborhoods,
Voluntary Associations and Consumer
Protection.*

[FR Doc. 79-36758 Filed 11-28-79; 8:45 am]

BILLING CODE 4210-01-M



Test Report
Federal Test Report

Thursday
November 29, 1979

Part VI

**Department of
Transportation**

Federal Aviation Administration

**Aircraft Wheels, Wheel-Brake Assemblies
and Tires; Revision of Standards and
Requirements**

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 23, 25 and 37

[Docket No. 18564; Amendment Nos. 23-24; 25-48; and 37-45]

Aircraft Wheels and Wheel-Brake Assemblies; Airworthiness and Performance Standards

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The purpose of this amendment is to revise the Technical Standard Order (TSO) for aircraft wheels and wheel-brake assemblies and related type certification requirements for airplane brakes. As revised, the standards will incorporate updated and improved minimum performance standards for the design and construction of aircraft wheels and brakes.

EFFECTIVE DATE: December 31, 1979.

FOR FURTHER INFORMATION CONTACT: Mr. Raymond E. Ramakis, Regulatory Projects Branch, AVS-24, Safety Regulations Staff, Associate Administrator for Aviation Standards, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591; telephone (202) 755-8716.

SUPPLEMENTARY INFORMATION:

Background

This amendment concerning aircraft wheels and wheel-brake assemblies is being issued concurrently with the amendment which updates the minimum performance standards applicable to aircraft tires. The preamble to the tires amendment (published also in this issue of the Federal Register) explains the background which has led to the need for revised standards for tires and for wheels and wheel-brake assemblies and their interrelation.

The accidents and incidents affecting large commercial jet airplanes involving landing gear have resulted in part from failures of tires and of wheels and brakes. With respect to wheels and wheel-brake assemblies, failure due to fatigue is one of the more common and serious types of failures experienced with aircraft wheels. To improve the overall strength of wheels and to reduce their susceptibility to fatigue, the standards for wheels are being revised. These amendments will require more severe testing of wheels and wheel-brake assemblies to substantiate the

load ratings of wheels and the kinetic energy capacity rating of brakes.

These amendments are based on a Notice of Proposed Rule Making, Notice No. 78-16, published in the Federal Register on December 7, 1978 (43 FR 57261). That notice invited comments by all interested persons. All persons have been afforded an opportunity to participate in the making of these amendments and due consideration has been given to all matter presented.

Significant comments received in response to Notice 78-16 are discussed below. A number of substantive, editorial, and clarifying changes have been made to the proposed rules based on relevant comments received and on further review within the FAA. Except for minor editorial and clarifying changes and those discussed below, these amendments and the reasons for their adoption are the same as those contained in Notice 78-16.

This amendment implements the President's directive (Executive Order 12044) that regulations be as simple as possible and not impose unnecessary burdens on the economy or on the regulated public. The amendment also promotes the public interest by increasing safety and the efficiency of aircraft through use of improved wheels and wheel-brake assemblies.

Discussion of General Comments

Fifteen commenters, including seven non-U.S. organizations, responded to Notice 78-16 with 64 comments. The majority of the comments presented the views of manufacturers and air carriers. In general, the commenters concerned themselves with those areas of the proposal they believe could be improved and raised no objection to the basic concept of the proposal. There were several favorable comments received in support of the proposal and one commenter stated that the proposed revision of the TSO is a significant improvement over the existing TSO.

Two commenters recommended that it should be demonstrated by test that the wheel flanges be able to withstand concentrated loads and not come apart under the condition of deflated or missing tires. There should be a specific test requirement which assures that a wheel will maintain its integrity with the loss of a mated tire. A new paragraph 4.1(c)(3) is added for this purpose.

Discussion of Specific Comments

§ 23.735 Brakes

A commenter suggested the numerical constant in the formula for calculating kinetic energy would be more accurate if written as 0.0443 in place of 0.0442 in

§ 23.735(a)(2) of the Federal Aviation Regulations (FAR). This change is adopted.

§ 25.735 Brakes

As pointed out by three commenters, § 25.75, which prescribes landing requirements for reciprocating engine powered transport category airplanes, was deleted by a recent amendment and should no longer be referred to in the rule. The reference to § 25.75 is replaced by a reference to § 25.125 which prescribes the landing requirements for all transport category airplanes.

Two commenters suggested that the numerical constant in the formula for calculating the kinetic energy requirements for each main wheel brake assembly should be 0.0443. The change is incorporated.

Three commenters recommended that "N", as it is used in the formula in § 25.735(f)(2), should be further defined as "the number of wheels with brakes" to be consistent with the TSO. The comment is valid. However, the word "main" must be a part of the definition because § 25.735(f) applies to the brakes on main wheels only. This aspect applies equally to the formula and definition in § 23.735(a)(2). The definitions of "N" in §§ 23.735(a)(2) and 25.735(f)(2) are amended accordingly.

Three commenters recommended that a reference to the accelerate-stop case should be made in § 25.735(f)(2). However, the requirements in that paragraph are for kinetic energy absorption requirements for brake assemblies in normal operations. The provisions for the accelerate-stop distance determination are set forth in §§ 25.105 and 25.109 which concern other performance requirements involved in emergency situations and which are not appropriate for § 25.735(f)(2).

Two commenters suggested that the words "wheel-brake assembly" as they appear in § 25.735 (f) and (g) should be changed to "wheel tire and brake assembly." However, tire requirements are covered in § 25.733 and experience has not indicated a need for the recommended change.

§ 37.172 Aircraft Wheels and Wheel-Brake Assemblies—TSO-C26C

§ 37.172(b) Marking

A commenter suggested that the date of manufacture should always be shown on the wheel and brake assemblies. However, no reason was given. The requirement is to mark the serial number or date of manufacture or both. The marking requirements are the minimums necessary for identification of the article

by the FAA. If the manufacturer elects to mark the article with the serial number alone, the FAA may obtain the date of manufacture from factory production records when needed. Therefore, it is not necessary that the date of manufacture be shown in all cases in order to adequately identify a wheel or wheel brake assembly.

One commenter recommended that tire change counters be included on the wheel and some external marking be placed on the wheel rim to indicate the position of drive keys to facilitate alignment with rotors on the brake heat sink. While tire change counters and alignment markings may be useful to maintenance personnel, they do not represent a safety consideration and should not be imposed as wheel and brake requirements. The customer may contract with the manufacturer to have these items marked on the wheel if desired.

§ 37.172(c) Data Requirements

A commenter recommended that "stop distance" and "average deceleration" be added as required data and also be added in paragraph 4.2(a)(2) of the TSO where the average deceleration would be defined as equalling the square of the brakes-on velocity (V_{br}) divided by twice the stop distance(s). As an alternative to adding the stop distance, it was recommended that the stop distance be equal to or less than the square of the brakes-on velocity divided by twice the average deceleration. The TSO establishes the minimum performance required of wheel and brakes. The manufacturer has the option of exceeding the requirements if it wishes. An aircraft or brake manufacturer may use the method recommended but should not be required to do so.

§ 37.172(d) Previously Approved Equipment

A commenter recommended a change in the rules to allow a manufacturer to complete its contractual obligations under the TSO requirements in effect at the time of the contract or a 2-year extension beyond the effective date of the new TSO. The problem is the long lead time required to design, build, and test certain types of equipment during which time the TSO may be changed. While this is not unique to wheels and brakes, in some cases a wheel/brake assembly, not yet approved, may be required to meet additional safety provisions contained under the new TSO. However, the rule does not negate any approvals given under the earlier TSO nor does it prohibit production of items under earlier approvals.

This commenter also contended that the new wheel and brake standards will result in increased costs to manufacturers, particularly for transport category airplanes. While some additional costs may be incurred initially because of the extra testing involved, the added safety resulting from fewer wheel failures and less damage to operating aircraft caused by wheel and brake failures will more than outweigh such costs.

Standard for Wheels and Wheel-Brake Assemblies

Paragraph 2(a)(1) Lubricant Retainers

A commenter suggested that the design criteria in the paragraph may be good for wheels but not necessarily applicable for the brake chassis. It contended that if grease retaining is used in the brake chassis, inadequate lubrication results, giving rise to excessive wear and bearing defects. However, there is no service history problem related to lubricant retainers on brake chassis and the commenter offered no supporting data for the suggestion. The paragraph is adopted as proposed.

Paragraph 2(a)(3) Adjustment

A commenter recommended that a requirement be added to specify that all brake units be fitted with pressure plate pull-off devices to ensure minimum running clearance when brakes are in the off position. It was asserted that the requirement would assist in reducing heat build-up during taxiing. The commenter did not justify the need for such a requirement. A brake designer is not prohibited from incorporating pressure plate pull-off devices if they are desired. However, no purpose would be served in listing the various brake design features such as pressure plate pull-off devices that may be desirable from an operations or maintenance viewpoint but are not necessary for safety.

Paragraph 2(a)(5) Explosion Prevention

A commenter suggested that more attention should be given to establishing the correct siting, number, and size of fuses. The commenter also cautioned that provision of too many fuses will increase the risk of running with under-inflated tires. However, the commenter did not recommend any changes or allege that the standard is inadequate. There is no service history to indicate problems with fuse plug selection. The current rule is adequate and is being continued in the new standard.

Paragraph 2.(a)(5) is adopted without change.

Paragraph 2.(b) Construction

A commenter stated that wheel failures are usually associated with fatigue or tire failure. The commenter noted that protection against fatigue failure is not adequately reflected in the standard and suggested that fatigue resistance enhancement measures (such as shot peening, cold rolling, etc.) could be required in fatigue critical areas. As suggested, there should be a specific requirement to improve the fatigue resistance of the wheel and a new section 2.(b)(11) is added for this purpose.

A commenter suggested that heavy emphasis should be placed on standardization with respect to the hub and bead seat areas, and the need for protection of aluminum alloy parts. The commenter asserted that in-service corrosion is a frequent cause of rim failures. Although possible cost benefits to manufacturers and operators may result from standardization of wheel and brake designs, such an option is open without the rules requiring it. Moreover, standardization imposed by the rules could inhibit new designs. With respect to the comments regarding the hub and bead seat areas and protection of aluminum alloy parts, requirements for these areas are adequately covered in paragraphs 2.(b)(1) and 2.(b)(8). No change is made to the proposal based on these comments.

Paragraph 2.(b)(6) Bolts and Studs

A commenter stated that during removal of wheel tie bolts, it has been common experience to find there is insufficient clearance between the socket and wheel surface using standard sockets. Further, if tools are worn, it is necessary to use an inserted protective surface to prevent wheel or brake damage. These comments relate to individual design considerations which may in some cases require special tools. They do not provide a basis for changing the standard.

Paragraph 2.(b)(7) Steel Parts

A commenter recommended that paragraph 2.(b)(7) include words limiting the use of cadmium plating on parts operating at temperatures above the melting point of cadmium. The comment has merit. Although cadmium and zinc plating have been satisfactory in protecting wheel and brake components against corrosion in the past, the TSO should not limit corrosion protection methods to cadmium and zinc plating. There may be other equivalent or better protection methods, including methods

better able to withstand temperature environments. Paragraph 2.(b)(7) is revised to allow other corrosion protection means.

Paragraph 2.(b)(9) Magnesium Parts

A commenter suggested that the use of magnesium alloy parts be avoided in transport category aircraft wheel and wheel-brake assemblies. In the standard, the use of magnesium is optional. The designer may select another material depending on the intended use of the wheel and brake units. If magnesium alloy is used, then it must be given corrosion protection as specified.

Paragraph 2.(b)(10) Bearing and Braking Surfaces

A commenter pointed out that paragraph 2.(b)(10) in TSO-C26b was not included in the proposal. The commenter asserted that although finish is not typically applied to assemblies, it is still appropriate to require protection of bearing and braking surfaces if a finish is to be applied. Clearly there is a need for the requirement. The paragraph was inadvertently omitted during the development of the proposal. Paragraph 2.(b)(10) is incorporated in the adopted rule.

Paragraph 3.(a)(2) Rating

A commenter suggested adding the word "radial" to "maximum limit load" in paragraph 3.(a)(2) to further qualify the meaning of the term. However, the word "radial" refers to direction and would be inappropriate for inclusion under this paragraph since the maximum limit load covers more than just radial loads. Paragraph 3.(a)(2) is adopted as proposed.

Paragraph 4.1 Wheel Tests

A commenter recommended the test inflation pressure be increased up to a factor of 3.5 in place of the factor of 2 to avoid bottoming the tire while under the ultimate test load in paragraphs 4.1(a)(3) and 4.1(b)(3). The commenter contended that aircraft tires are operationally subject to test overpressures of 4 and 4.5 times their rated inflation pressure. The purpose of the ultimate load test is to load the wheel in a manner which is indicative of in-service conditions. Increasing the tire inflation pressure would provide an incorrect distribution of load on the wheel. Under the proposal, when tire bottoming occurs due to the application of ultimate test loads, provision is made for use of a loading block which fits between the rim flanges and simulates the load transfer of the tire. This test arrangement is satisfactory for determining yield and

ultimate strengths of the wheel. No change is made based on this comment.

Another commenter objected to allowing the tire pressure to be increased up to 2 times the rated inflation pressure to avoid tire bottoming during the ultimate load tests in paragraph 4.1(a)(3) and 4.1(b)(3). It was claimed that the test pressure allowed eliminates the only test condition that tests wheel flanges under concentrated loads. The commenter asserted that concentrated loads on the wheel flanges may occur when the wheel is rolling while the tire is deflated or missing. Finally, the commenter suggested that if the proposed test pressure is allowed, a separate test should be devised that demonstrates wheel flange strength. As previously discussed under General Comments there is sufficient justification to require a demonstration of flange strength based upon a missing tire, and a separate test is added under paragraph 4.1(c)(3). No other changes to paragraph 4.1 (a)(3) or (b)(3) are necessary.

A commenter contended that recent experience indicates there is a need for wheel tests with the brake unit installed. It was suggested that such tests be conducted under the test loads specified in proposed paragraph 4.1. In addition, the commenter recommended the tests include checks for adequate clearances between the wheel drive keys and brake rotor assembly while under test loading conditions. The commenter did not identify the experience and FAA records do not indicate any such problems in connection with past approvals of wheel and brake assemblies. Paragraph 4.1(a) is adopted without change.

A commenter suggested that the ultimate test in paragraph 4.1(b)(3) be done with side loads applied in the most critical direction. However, such detailed specification is unnecessary since the direction, including inboard and outboard side directions, and magnitude of the test loads are established in accordance with the FAR sections referenced in the standard.

A commenter pointed out that the use of the loading block specified in paragraph 4.1(b)(3) is incompatible with the statement in paragraph 4.1(b)(1). For clarification, the words "or the loading block" are added immediately after the word "tire" in the eighth sentence of paragraph 4.1(b)(1). Another commenter wanted the fit and loading position of the loading block to be more clearly defined. However, the paragraph prescribes the length of arc, the width and fit, and the load transfer characteristics of the block and therefore provides adequate information for use of the loading block.

A commenter contended that the yaw roll test of paragraph 4.1(c)(2) should be conducted with radial and side load components resulting from a 0.15g turn of the aircraft at the maximum weight and most adverse center of gravity location, as determined by the airframe manufacturer. Although the values of 0.15S and 0.15g are numerically equal, the side load component is more clearly defined as 0.15S rather than specifying a 0.15g turn condition as suggested by the commenter. Moreover, the maximum static load (S) is defined in terms of design takeoff weight and critical center of gravity as provided in § 25.731(b), which is referenced in paragraph 3.(a)(1). Another commenter understood that the intent of the proposed yaw roll test is to simulate a 0.15g turn condition and noted that the side load component is described as 0.15S in which S is a static load. The commenter did not distinguish the relationship of the terms 0.15g and 0.15S. There is no reason for wheel and brake manufacturers to have difficulty in interpreting the meaning of 0.15S since the ground loads section of Part 25 designates side loads in terms of vertical ground reactions. No change is made based on these comments.

A commenter suggested that "radial load" be changed to "vertical load" in paragraph 4.1(c). It is asserted that a vertical load would be perpendicular to the loading surface, whereas a radial load will have the same angular orientation as the wheel. However, in normal testing the orientation of the test wheel with respect to the loading surface may be such that applied loads are horizontal. In addition, the language is clear in the standard in requiring the radial load to be applied to the wheel through the axle and perpendicular to the load surface. The term "radial load", therefore, accurately expresses the intent.

A commenter suggested that it should be made clear what rotational speed of the wheel is required in the roll test. Its experience is said to indicate that a good speed is about 10 miles per hour. However, the commenter did not provide any information to show that the standards should include a specified wheel test speed. Actually, although the roll performance of the wheel is not affected by roll speed, the roll speed must be selected to accommodate the operating characteristics of the installed tire. Under the proposal, the intent is that the applicant select any speed consistent with the tire characteristics.

A commenter recommended that the wheel roll tests should include an overload test requirement. It has pointed out that in light of the 1.5 overload test

factor for tires, wheel test criteria should at least match this requirement. It was alleged that wheels can be subjected to twice their normal rated load on more than one occasion during their service life. In this connection, however, significant improvements in wheel testing are being made in this standard over the wheel tests in the previous TSO and provide the equivalent of the overload test suggested by the commenter. An overload test for wheels is therefore not needed.

A commenter pointed out that since a 7 percent safety margin was introduced for tires on transport category airplanes, it is advisable to include a 7 percent strength margin for wheels. It was suggested that one method of accomplishment would be to revise the overpressure factor from "4.0" to "4.07" in paragraph 4.1(d)(1). The comment, however, does not take into account that the overpressure factor for wheels is being increased 14 percent under paragraph 4.1(d)(1) which more than compensates for the 7 percent load margin applied to main dual wheel tires. The comment offers no justification for increasing the overpressure factor above 14 percent. This increased factor, being adopted as proposed, provides the necessary strength margin.

One commenter objected to the 4.0 overpressure factor in paragraph 4.1(d)(1), contending that the reasoning behind the increase from 3.5 to 4.0 was not understood. It was claimed that overinflation in service of this magnitude was highly unlikely and the 3.5 factor seemed acceptable. In recent years some air carriers have been operating with higher tire inflation pressures resulting in fewer tire-wheel-brake failures due to lower operating temperatures. The continued operation at higher inflation pressures requires stronger wheels to maintain their normal life expectancy. In addition, tire standards now include a higher overpressure factor (4.0) requirement for all types of tires. Thus, a compatible overpressure test for wheels is needed to establish a level of safety consistent with that of tires. No change is made based on this comment.

Two commenters supported the proposed 4.0 overpressure factor. One stated that the overpressure factor 4.0 should improve the strength of wheels. The other suggested that under conditions of high heat transfer, it should be demonstrated that the wheel is able to dissipate its pressure down to a residual level which will not cause bursting if wheel strength is impeded. However, such a requirement would inhibit design. The wheel and brake

designer must account for critically high temperatures and pressures that may occur by installing adequate temperature and pressure-sensitive relief devices.

Two commenters objected to the 5 percent maximum pressure drop from rated inflation pressure in a 24-hour period in the diffusion test requirement of paragraph 4.1(d)(2). They suggested the 5 percent be lowered and one recommended specifically that it be revised to 3 percent. The other supported the need for an overall leakage factor no greater than 5 percent and noted correctly that since the tire alone is allowed 5 percent, the leakage factor for the wheel would then have to be zero percent. The standard provides that the tire-wheel combination be subjected to the diffusion test for which the 5 percent pressure drop limit provides the required level of safety. The recommendation for a change to 3 percent was unsupported and the commenter provided no basis for going to a stricter limit. Therefore, no change is made based on these comments.

Paragraph 4.2 Wheel-Brake Assembly Tests

Where a wheel, as part of a wheel-brake assembly, has previously been tested at a relatively high kinetic energy level, one commenter recommended that when a different brake of lower kinetic energy is to be later used with the same wheel, only the brake should be required to be tested. The test is suggested, according to the commenter, because a given wheel model may be fitted with any brake assembly models. However, the test procedures recommended would not be in accord with § 25.735(f) and proposed paragraph 4.2 which require wheel and brake units to be tested as assemblies. Under the commenter's proposal, the functional compatibility of the wheel and brake would be unknown since they would not have been tested as a unit. Therefore, no change is made to paragraph 4.2 based on this comment.

A commenter noted that paragraph 4.2 does not appear to require any kinetic energy margin to be built into the brake. That is correct; it is not necessary to require a specific safety margin if it can be demonstrated that the brakes are adequate for the purpose intended and can operate safely.

The commenter also noted that the proposed tests allow credit for all brakes on an aircraft when there have been cases during rejected takeoffs where one or more tires have blown thereby rendering the corresponding brakes ineffective. However, the rationale is that wheels and brakes

should not be unduly penalized by requiring over-design because tires may fail in operation. As pointed out previously, the FAA is upgrading aircraft tire standards to strengthen tires which will result in safer tire-wheel-brake combinations for the future. No change is made based on the comment.

Three commenters suggested that the word "tyre" be included in the term "wheel-brake assembly" in the proposed paragraph 4.2. It was stated that adding the word "tyre" would avoid the use of test tire which might absorb more than the correct share of kinetic energy. As suggested, the requirement should be clarified and the paragraph has been changed to specify inclusion of a suitable tire of proper fit.

These commenters also recommended that the word "torque" be deleted from the title "Dynamic torque tests" in paragraph 4.2(a). However, the word is appropriately used in the standard since the intent is to measure torque accurately.

These commenters further contended that where the energy absorbed by the tire can be satisfactorily established, an allowance for this should be made. However, this would effectively reduce the required kinetic energy ratings for wheel-brake assemblies and would be contrary to current safety needs to upgrade wheel and brake units.

These commenters also asserted that the last sentence in paragraph 4.2(a)(1)(ii) about not considering decelerating effects of certain equipment is inconsistent with § 25.125(b)(3). To the contrary, however, the language in the standard clarifies the test conditions by identifying those items whose decelerating effects are disallowed. Moreover, allowance of the proscribed deceleration effects in the qualification tests would reduce brake energy capacity ratings and would be contrary to the intent of the standard to upgrade wheel and brake standards.

Two commenters pointed out that Method II in paragraph 4.2(a)(1)(ii) is allowed only for landing and recommended that it also be allowed for the accelerate-stop case. The first sentence of paragraph 4.2(a)(1)(ii) is amended accordingly.

Paragraph 4.2(a)(2) Test Requirements

Two commenters suggested that the deceleration rates specified in Table II in paragraph 4.2(a)(2) be defined as equalling $V^2/2S$, where V equals brakes-on velocity and S equals the stop distance. They claimed that stop distance is the key parameter in determining acceptability of the test results and that deceleration rate based on "time" will not necessarily result in

an acceptable test. The comment is not accepted since the stop distance will vary between airplanes and can be established from the rate of deceleration as appropriate.

A commenter recommended that for the products already approved by TSO-C26b, only 100 design landing stops should be required for the brake assembly, without the wheel, for certification under TSO-C26c. However, as discussed earlier in connection with kinetic energy considerations, a wheel and brake must be tested together to assure compatibility of performance.

Four commenters recommended that the accelerate-stop test required in paragraph 4.2(a)(2) of the standard be conducted with brakes approaching the fully worn state. They maintain that the wearing elements of the brake assembly may be worn to a condition in which they are no longer capable of absorbing the maximum kinetic energy expected in service such as an accelerate-stop condition. However, in-service maintenance records do not indicate that there are failures associated with worn brakes not meeting rejected takeoff energy levels. Moreover, wear indicators on the brakes and required maintenance checks assure that brakes are replaced prior to the point at which they are no longer capable of absorbing the maximum kinetic energy. The commenters presented no evidence substantiating a need for such a test.

A commenter suggested that the accelerate-stop deceleration rate in Table II selected by the manufacturer should be required to be equal to or greater than the deceleration required to produce the performance published in the Aircraft Flight Manual (AFM). However, no basis has been presented to relate requirements in the standard with the AFM as suggested by the commenter. The deceleration values used in certifying wheel-brake assemblies are selected by the manufacturer to obtain an estimated braking capability. The information in the AFM is related to actual aircraft flight test data.

A commenter recommended that for the sake of safety, the accelerate-stop requirement in proposed Table II should be applicable to all aircraft. However, it is not practical to determine an accelerate-stop distance for a single-engine airplane or any rotorcraft. Paragraph 4.2(a)(2) is adopted without change.

Paragraph 4.2(a)(3) General Conditions

One commenter suggested that the following sentence be added to paragraph 4.2(a)(3)(ii): "Towards the end

of the accelerate-stop test (KE_{RT}), it is permissible to release the brake when the inertia testing machine speed has reduced to not more than 10 knots." It claimed that for some brakes where the value of KE_{RT} is particularly high, it is possible for the friction elements to seize up at the end of the accelerate-stop thus preventing the brake from being usable for taxi. The suggestion would not be in accord with § 25.109 which requires the airplane to come to a full stop during the accelerate-stop test.

A commenter suggested that the requirement for the brake to be usable for taxi after the accelerate-stop test be qualified by specifying taxi distance, taxi speed, and the number of additional brake applications expected following the deceleration. In view of present service experience there is no safety basis for requiring a brake to be usable after an accelerate-stop test. Accelerate-stop performance is currently predicated upon a condition of nonusable brakes and the allowance for subsequent maintenance prior to the removal of the airplane from the runway. Accordingly, paragraph 4.2(a)(3) is adopted as proposed.

Paragraph 4.2(d) Endurance Tests—Hydraulic Brakes.

A commenter pointed out that no consideration is given to the size of the brake equipment in the 5cc maximum leakage test in the standard. It asserted that since leakage varies with the size of the equipment, the 5cc limit appears to unjustly penalize large systems. This commenter recommended the proposed leakage rate be revised by allowing one drop per 25 cycles per 3-inch seal periphery. Another commenter asserted that it would consider its smallest brake a failure if it leaked 5cc. On the other hand, it was claimed that if its largest brake were to leak 5cc, it would consider the leakage minimal. This commenter suggested military standards be adopted, which in effect specify that after 25 cycles, (1) leakage at static seals not exceed a trace, and (2) leakage at moving seals not exceed one drop of fluid per each 3 inches of peripheral seal length. Although several methods of leakage measurements are available, the volumetric approach proposed in the notice gives a uniform standard and 5cc is acceptable for all sizes. Moreover, with reference to using words "trace" and "drop" as in the military standard, such terms do not define an identifiable and enforceable standard. The paragraph is adopted as proposed.

Adoption of the Amendment

Accordingly, Parts 23, 25, and 37 of the Federal Aviation Regulations (14 CFR

Parts 23, 25, and 37) are amended as follows, effective December 31, 1979.

PART 23—AIRWORTHINESS STANDARDS: NORMAL, UTILITY, AND ACROBATIC CATEGORY AIRPLANES

1. By amending § 23.735 by revising paragraph (a)(2) to read as follows:

§ 23.735 Brakes.

(a) * * *

(2) Instead of a rational analysis, the kinetic energy absorption requirements for each main wheel brake assembly may be derived from the following formula:

$$KE = 0.0443 WV^2/N$$

where—

KE = Kinetic energy per wheel (ft.-lb.);

W = Design landing weight (lb.);

V = Airplane speed in knots. V must be not less than V_{SO} , the poweroff stalling speed of the airplane at sea level, at the design landing weight, and in the landing configuration; and

N = Number of main wheels with brakes.

PART 25—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

§ 25.735 [Amended]

2. By amending § 25.735(b) by deleting "§ 25.75" and inserting in place thereof "§ 25.125."

3. By amending § 25.735 by revising paragraph (f)(2) to read as follows:

§ 25.735 Brakes.

(f) * * *

(2) Instead of a rational analysis, the kinetic energy absorption requirements for each main wheel brake assembly may be derived from the following formula, which assumes an equal distribution of braking between main wheels:

$$KE = 0.0443 WV^2/N$$

where—

KE = Kinetic energy per wheel (ft.-lb.);

W = Design landing weight (lb.);

V = Airplane speed in knots. V must be not less than V_{SO} , the poweroff stalling speed of the airplane at sea level, at the design landing weight, and in the landing configuration; and

N = Number of main wheels with brakes.

The formula must be modified in cases of unequal braking distribution.

4. By amending § 25.735(g) by deleting the term " V_{SO} " and inserting in place thereof the letter "V".

PART 37—TECHNICAL STANDARD ORDER AUTHORIZATIONS

5. By revising § 37.172 to read as follows:

§ 37.172 Aircraft wheels and wheel-brake assemblies—TSO-C26c.

(a) *Applicability.* This Technical Standard Order prescribes the minimum performance standards that aircraft landing wheels and wheel-brake assemblies must meet in order to be identified with the applicable TSO marking. New models of such equipment which are to be so identified and which are manufactured on or after December 31, 1979, must meet the requirements of the Federal Aviation Administration Standard for Aircraft Wheels and Wheel-Brake Assemblies set forth at the end of this section.

(b) *Marking.* In lieu of the marking requirements of § 37.7, aircraft wheels and wheel-brake assemblies must be legibly and permanently marked with the following information:

(1) Name of the manufacturer responsible for compliance.

(2) Serial number, or date of manufacture, or both.

(3) Part number.

(4) Applicable technical standard order (TSO) number.

(5) Size (this marking applies to wheels only).

All stamped, etched, or embossed markings must be located in noncritical areas.

(c) *Data requirements.* (1) In addition to the data specified in § 37.5, the manufacturer must furnish to the Chief, Engineering and Manufacturing Branch, Federal Aviation Administration, in the region in which the manufacturer is located (or, in the case of the Western Region, the Chief, Aircraft Engineering Division), the following technical data:

(i) One copy of the applicable limitations pertaining to installation of wheels and brakes on aircraft, including the weight of the brake assembly, maximum static load rating, maximum limit load rating, maximum accelerate-stop kinetic energy in foot-pounds (KE_{RT}), design landing kinetic energy in foot-pounds (KE_{DL}), accelerate-stop deceleration in feet-second², design landing stop deceleration in feet/second², applicable speed as specified in paragraph 4.2(a)(1) of the FAA Standard for Aircraft Wheels and Wheel-Brake Assemblies, type of hydraulic fluid used, and the weight of the wheel.

(ii) One copy of the manufacturer's test report.

(2) Upon request of the regional office specified in paragraph (c)(1) of this section, the manufacturer must furnish the applicable maintenance instructions.

(d) *Previously approved equipment.* Wheels and wheel-brake assemblies approved prior to December 31, 1979, may continue to be manufactured under the provisions of their original approval.

Federal Aviation Administration Standard for Aircraft Wheels and Wheel-Brake Assemblies**1. Purpose.**

This document contains minimum performance standards for aircraft landing wheels and wheel-brake assemblies.

2. Design and construction.**(a) Design.**

(1) *Lubricant retainers.* Lubricant retainers must retain the lubricant under all operating conditions, prevent the lubricant from reaching braking surfaces, and prevent foreign matter from entering the bearings.

(2) *Removable flanges.* All removable flanges must be assembled onto the wheel in a manner that will prevent the removable flange and retaining device from leaving the wheel if a tire should deflate while the wheel is rolling.

(3) *Adjustment.* When necessary to assure safe performance, the brake mechanism must be equipped with suitable adjustment devices.

(4) *Water seal.* Wheels intended for use on amphibious aircraft must be sealed to prevent entrance of water into the wheel bearings or other portions of the wheel or brake, unless the design is such that brake action and service life will not be impaired by the presence of sea water or fresh water.

(5) *Explosion prevention.* Unless determined to be unnecessary, means must be provided to minimize the probability of wheel and tire explosions which result from elevated brake temperatures.

(b) Construction.

(1) *Castings.* Castings must be of high quality, clean, sound, and free from blowholes, porosity, or surface defects caused by inclusions, except that loose sand or entrapped gases may be allowed when the serviceability of the casting has not been impaired.

(2) *Forgings.* Forgings must be of uniform condition and free from blisters, fins, folds, seams, laps, cracks, segregation, and other defects. If strength and serviceability are not impaired, imperfections may be removed.

(3) *Rim surfaces.* For wheels designed for use with a tire and inner tube combination, the surface of the rim between bead seats must be free from defects which would be injurious to the inner tube while mounting the tire or while in service.

(4) *Rim joints.* For wheels designed for use with a tire and inner tube combination, joints in the rim surface and joints between rim surfaces and demountable flanges must be smooth, close fitting, and noninjurious to the inner tube while mounting the tire or while in service.

(5) *Rivets and bolts.* When rivets are used, they must be well headed over, and rivets and bolts coming in contact with the casing or tube must be smooth enough not to damage the tube or casing during normal operation.

(6) *Bolts and studs.* When bolts and studs are used for fastening together sections of a wheel, the length of the threads for the nut extending into and bearing against the sections must be held to a minimum and there must be sufficient unthreaded bearing area to carry the required load.

(7) *Steel parts.* All steel parts, except braking surfaces and those parts fabricated

from corrosion-resistant steel must be cadmium plated or zinc plated or have equivalent protection from corrosion.

(8) *Aluminum parts.* All aluminum alloy parts must be anodized or have equivalent protection from corrosion. This protection must include protection for fuse plug holes, valve stem holes, and other passages.

(9) *Magnesium parts.* All magnesium alloy parts must receive a suitable dichromate treatment or have equivalent protection from corrosion. This protection must include protection for fuse plug holes, valve stem holes, and other passages.

(10) *Bearing and braking surfaces.* The bearings and braking surfaces must be protected during the application of finish to the wheels and brakes.

(11) *Fatigue.* The construction of the wheel must take into account techniques used to improve fatigue resistance of critical areas of the wheel.

3. Rating.

(a) Each wheel design must be rated for the following:

(1) S = Maximum static load in pounds (ref. §§ 23.731(b), 25.731(b), 27.731(b), and 29.731(b) of this chapter).

(2) L = Maximum limit load in pounds (ref. §§ 23.731(c), 25.731(c), 27.731(c), and 29.731(c) of this chapter).

(b) Each wheel-brake assembly design must be rated for the following:

(1) KE_{DL} = Kinetic energy capacity in foot-pounds per wheel-brake assembly, at the design landing rate of absorption.

(2) KE_{RT} = Kinetic energy capacity in foot-pounds per wheel-brake assembly at the maximum accelerate-stop rate of absorption for wheel-brake assemblies of airplanes certificated under Part 25 of this chapter only.

4. *Qualification tests.* The aircraft wheels and wheel-brake assemblies must be tested as follows and the test data included in the applicant's test report required by § 37.172(c)(1)(ii) of this part.

4.1 *Wheel tests.* To establish the S and L ratings for a wheel, test a standard sample in accordance with the following radial, combined, and static load tests:

(a) *Maximum radial load test.* Test the wheel for yield and ultimate loads as follows:

(1) *Test method.* Mount the wheel with a suitable tire of proper fit installed, on its axle, and position it against a flat nondeflecting surface. The wheel axle must have the same angular orientation to the nondeflecting surface that it will have to the runway when it is mounted on the aircraft and is under the maximum limit load. Inflate the tire to the pressure recommended for the S load with air or water. If water inflation is used, the water must be bled off to obtain the same tire deflection that would result if air inflation were used. Water pressure may not exceed the pressure which would develop if air inflation were used and the tire deflected to its maximum extent. Load the wheel through its axle perpendicular to the flat nondeflecting surface. Deflection readings must be taken at suitable points to indicate deflection and permanent set of the wheel rim at the bead seat.

(2) *Yield load.* Apply to the wheel a load not less than 1.15 times the maximum radial limit load, determined under §§ 23.471

through 23.511 or §§ 25.471 through 25.511, or §§ 27.471 through 27.505, or §§ 29.471 through 29.511 of this chapter, as appropriate. Apply the load with the wheel positioned against the nondeflecting surface, and the valve hole positioned at 90 degrees with respect to the line between the center of the wheel and the point of contact, then with the valve hole positions 180 degrees, 270 degrees, and 0 degrees from the nondeflecting surface. The 90 degree increments must be altered to other positions if the other positions are more critical. Three successive loadings at the 0 degree position may not cause permanent set increments of increasing magnitude. The permanent set increment caused by the last loading at the 0 degree position may not exceed 5 percent of the deflection caused by that loading or 0.005 inches, whichever is greater. The bearing cups, cones, and rollers used in operation must be used for these loadings. There must be no yielding of the wheel such as would result in loose bearing cups, air, or water leakage through the wheel or past the wheel seal, or interference in any critical areas.

(3) *Ultimate load.* Apply to the wheel a load, not less than 2 times the maximum radial limit load for castings and 1.5 times the maximum radial limit load for forgings, determined under §§ 23.471 through 23.511, or §§ 25.471 through 25.511, or §§ 27.471 through 27.505, or §§ 29.471 through 29.511 of this chapter, as appropriate. Apply the load with the same wheel positioned against the nondeflecting surface and the valve hole positioned at 0 degrees with respect to the line between the center of the wheel and the point of contact. The wheel must be able to support the load without failure for at least 3 seconds. The bearing cones may be replaced with conical bushings, but the cups used in operation must be used for this loading. If, at a point of loading during the test, it is shown that the tire will not successfully maintain pressure or if bottoming of the tire on the nondeflecting surface occurs, the tire pressure may be increased to no more than 2 times the rated inflation pressure. If bottoming of the tire continues to occur with this increased pressure, a loading block which fits between the rim flanges and simulates the load transfer of the inflated tire may be used. The arc of wheel supported by the loading block must be no greater than 60 degrees.

(4) If the radial limit load in paragraph 4.1(b) is equal to or greater than the maximum radial limit in paragraph 4.1(a)(2) and (3), the tests specified in paragraphs 4.1(a)(2) and (3) may be omitted.

(b) *Combined radial and side load test.* Test the wheel for the yield and ultimate loads as follows:

(1) *Test method.* Mount the wheel, with a suitable tire of proper fit installed, on its axle, and position it against a flat nondeflecting surface. The wheel axle must have the same angular orientation to the nondeflecting surface that it will have to the runway when it is mounted on the aircraft and is under the combined radial and side load. Inflate the tire to the pressure recommended for the maximum static load with air or water. If water inflation is used, the water must be bled off to obtain the same tire deflection that

would result if air inflation were used. Water pressure may not exceed the pressure which would develop if air inflation were used and the tire deflected to its maximum extent. For the radial load component, load the wheel through its axle perpendicular to the flat nondeflecting surface. For the side load component, load the wheel through its axle parallel to the flat nondeflecting surface. The side load reaction must arise from the friction of the tire or the loading block on the nondeflecting surface. Apply the two loads simultaneously, increasing them either continuously or in increments no larger than 10 percent of the loads to be applied. Alternatively, a resultant load equivalent to the radial and side loads may be applied to the axle. Deflection readings must be taken at suitable points to indicate deflection and permanent set of the wheel rim at the bead seat.

(2) *Yield load.* Apply to the wheel radial and side loads not less than 1.15 times the respective ground loads determined under §§ 23.485, 23.497, and 23.499, or §§ 25.485, 25.495, 25.497, and 25.499, or §§ 27.485 and 27.497, or §§ 29.485 and 29.497 of this chapter, as appropriate. Apply these loads with the wheel positioned against the nondeflecting surface and the valve hole positioned at 90 degrees with respect to the line between the center of the wheel and the point of contact, then with valve hole positioned at 180 degrees, 270 degrees, and 0 degrees from the nondeflecting surface. The 90 degree increments must be altered to other positions if the other positions are more critical. Three successive loadings at the 0 degree position may not cause permanent set increments of increasing magnitude. The permanent set increment caused by the last loading at the 0 degree position may not exceed 5 percent of the deflection caused by that loading, or 0.005 inch, whichever is greater. The bearing cups, cones, and rollers used in operation must be used in this test. There must be no yielding of the wheel such as would result in loose bearing cups, air or water leakage through the wheel or past the wheel seal, or interference in any critical areas. A tire and tube may be used when testing a tubeless wheel only when it has been demonstrated that pressure will be lost due to the inability of a tire bead to remain properly positioned under the load. The wheel must be tested for the most critical inboard and outboard side loads.

(3) *Ultimate load.* Apply to the wheel radial and side loads not less than 2 times for castings and 1.5 times for forgings the respective ground loads determined under §§ 23.485, 23.497, and 23.499, or §§ 25.485, 25.495, 25.497, and 25.499, or §§ 27.485 and 27.497, or §§ 29.485 and 29.497 of this chapter, as appropriate. Apply these loads with the same wheel positioned against the nondeflecting surface and the valve hole positioned at 0 degrees with respect to the center of the wheel and the point of contact. The wheel must be able to support the load without failure for at least 3 seconds. The bearing cones may be replaced with conical bushings, but the cups used in operation must be used for this loading. If, at a point of loading during the test, it is shown that the tire will not successfully maintain pressure or

if bottoming of the tire on the nondeflecting surface occurs, the tire pressure may be increased to no more than 2 times the rated inflated pressure. If bottoming of the tire continues to occur with this increased pressure, a loading block which fits between the rim flanges and simulates the load transfer of the inflated tire may be used. The arc of wheel supported by the loading block must be no greater than 60 degrees.

(c) *Maximum static load test.* Test the wheel for the maximum static load test as follows:

(1) *Test method.* Mount the wheel, with a suitable tire of proper fit installed, on its axle, and position it against a flat nondeflecting surface or a flywheel. The wheel axle must have the same angular orientation to the load surface that it will have to the runway when it is mounted on the aircraft and is under the maximum static load. Inflate the tire to the pressure recommended for the maximum static load "S". The radial load must be applied to the wheel through the axle and perpendicular to the load surface. The side load, when required, must be applied through the wheel axle and parallel to the load surface. For the side load, the wheel axle must be rotated or yawed to the angle which will produce a side load component equal to 0.15 "S" while the wheel is being roll tested.

(2) *Roll test.* The wheel must be tested under the loads and for the distance shown in Table I. At the end of the test there must be no cracks on the wheel and no leakage through the wheel or past the wheel seal, and the bearing cups may not be loosened in the hub.

Table I

Category of aircraft	Load conditions	Roll distance (miles)
Part 25	Maximum static load, "S"	2000
	Maximum static load, "S" plus 0.15 "S" side load applied in outboard direction.	100
	Maximum static load, "S" plus 0.15 "S" side load applied in inboard direction.	100
Part 23	Maximum static load, "S"	1000
Part 27 and 29	Maximum static load, "S"	250

(3) *Roll on Rim Test.* The wheel without a tire must be tested at a speed not less than 10 mph under the loads and distance shown in Table II. The test axle angular orientation with the load surface must approximate that of the airplane axle to the runway under maximum static load. At the end of the test there may be cracks but no fragmentation of the wheel. (V_R = takeoff speed in knots.)

Table II

Category of aircraft	Load conditions	Roll distance (feet)
Part 25	Maximum static load "S"	$V_R^2 \times 0.5$

(d) *Pressure test.* Pressure test the wheel in accordance with the following:

(1) *Overpressure test.* The wheel must be hydrostatically tested to withstand without failure for at least 3 seconds application of an

overpressure factor not less than 4.0 for Part 25 airplanes, 3.5 for Part 23 airplanes, and 3.0 for rotorcraft, times the rated inflation pressure determined by the applicant.

(2) *Diffusion test.* The tubeless tire and wheel assembly must hold the rated inflation pressure for 24 hours with no greater pressure drop than 5 percent. This test must be performed after the tire growth has stabilized.

4.2 *Wheel-brake assembly test.* A sample of a wheel-brake assembly design, with a suitable tire of proper fit installed, must meet the following tests to qualify the design for its kinetic energy ratings. The wheel of a wheel-brake assembly must be separately tested under paragraph 4.1. The wheel-brake assembly must be tested with the operating medium specified by the manufacturer.

(a) *Dynamic torque tests.* The wheel-brake assembly on the suitable inertial brake testing machine in accordance with the following:

(1) *Speed and weight values.* For airplanes, select either Method I or Method II below to calculate the kinetic energy level which a single wheel and wheel-brake assembly will be required to absorb. For rotorcraft, use Method I.

(i) *Method I.* Calculate the kinetic energy level to be used in the brake testing machine by using the equation:

$$KE = \frac{0.0443 WV^2}{N}$$

Where—

KE=Kinetic energy per wheel-brake assembly (ft.-lbs.);

W=Design landing weight (lbs.);

V=Aircraft speed in knots. V must be not less than V_{SO} the poweroff stalling speed of the aircraft at sea level, at the design landing weight, and the landing configuration. For the accelerate-stop tests applicable only to wheel-brake assemblies for airplanes certificated under Part 25 of this chapter, the manufacturer must determine the most critical combination of takeoff weight and speed;

N=Number of wheels with brakes. For rotorcraft, the manufacturer must calculate the most critical combination of takeoff weight and brake application speed to be used in the above equation.

(ii) *Method II.* The speed and weight values may be determined by other equations based on rational analysis of the sequence of events expected to occur during an accelerate-stop condition or an operational landing at maximum landing weight. The analysis must include rational or conservative values for braking coefficients of friction between the tire and runway, aerodynamic drag, propeller drag, powerplant forward thrust, and, if critical, loss of drag credit for the most adverse single-engine or propeller due to malfunction. Do not consider the decelerating effects of propeller reverse pitch, drag parachutes, and powerplant thrust reversers.

(2) *Test requirements.* The wheel-brake assembly must bring the inertial testing machine to a stop at the average deceleration, and for the number of repetitions specified in Table III without

failure, impairment of operation, or replacement of parts except as permitted in paragraph 4.2(a)(3).

Table III

Category of aircraft	Test
Parts 23 and 25	KE _{DL} : 100 design landing stops at a deceleration selected by manufacturer but not less than 10 ft./sec. ²
Part 25	KE _{RT} : 1 accelerate-stop at a deceleration selected by manufacturer but not less than 6 ft./sec. ²
Parts 27 and 29	KE _{DL} : 20 design landing stops at a deceleration selected by manufacturer but not less than 6 ft./sec. ²

(3) General conditions.

(i) During landing stop tests (KE_{DL}), one change of brake lining is permissible. The remainder of the brake assembly parts must withstand the 100 KE_{DL} stops without failure or impairment of operation.

(ii) During the accelerate-stop test (KE_{RT}), brake lining and bare disks may be new or used. No less than two landing stop tests must have been completed on the brake prior to this test. The brake must be usable for taxi after the accelerate-stop test to KE_{RT}.

(iii) As used this paragraph, "brake lining" is either individual blocks of wearing material or disks which have wearing material integrally bonded to them. "Bare disks" are plates or drums which do not have wearing material integrally bonded to them.

(d) *Brake structural torque test.* Apply load S and a torque load specified in paragraph 4.2(b) (1) or (2), as applicable, for at least 3 seconds. Rotation of the wheel must be resisted by a reaction force transmitted through the brake or brakes by an application of at least maximum brake line pressure or brake cable tension in the case of a nonhydraulic brake. If such pressure or tension is insufficient to prevent rotation, the friction surface may be clamped, bolted, or otherwise restrained while applying the pressure or tension.

(1) For landing gears with only one wheel per landing gear strut, the torque load is 1.2 SR where R is the normal loaded radius of the tire at rated inflation pressure under load S.

(2) For landing gears with multiple wheels per landing gear strut, the torque load is 1.44 SR where R is the normal loaded radius of the tire at rated inflation pressure under load S.

(c) *Overpressure—hydraulic brakes.* The brake with actuator piston extended to simulate a maximum worn condition must withstand hydraulic pressure for at least 3 seconds, equal to the following:

(1) For airplanes, 2 times the maximum brake line pressure available to the brakes.

(2) For rotorcraft, 2 times the pressure required to hold the rotorcraft on a 20 degree slope at design takeoff weight.

(d) *Endurance tests—hydraulic brakes.* The hydraulic brake assembly must be subjected to an endurance test during which the total leakage may not exceed 5cc and no malfunction may occur during or upon completion of the test. Minimum piston travel during the test may not be less than the

maximum allowable piston travel in operation. The tests must be conducted by subjecting the hydraulic brake assembly to—

(1) 100,000 cycles for airplanes, and 50,000 cycles for rotorcraft, of application and release of the average hydraulic pressure needed in the KE_{DL} tests specified in paragraph 4.2(a)(2) except that manufacturers using Method II in conducting the tests specified in paragraph 4.2(a)(2) must subject the wheel-brake assembly to the average of the maximum pressures needed in those tests. The piston must be adjusted so that 25,000 cycles for airplanes, and 12,500 cycles for rotorcraft, are performed at each of the four positions where the piston would be at rest when adjusted for 25, 50, 75, and 100 percent of the wear limit; and

(2) 5,000 cycles for airplanes, and 2,500 cycles for rotorcraft at the maximum system pressure available to the brakes.

(Secs. 313(a), 601, and 603, Federal Aviation Act of 1958, as amended (49 U.S.C. 1354(a), 1421, and 1423); sec. 6(c), Department of Transportation Act (49 U.S.C. 1655(c)).)

Note.—The FAA has determined that this document involves a regulation which is not considered significant under Executive Order 12044, as implemented by DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). A copy of the final evaluation prepared for this action is contained in the regulatory docket. A copy of it may be obtained from the person listed under the heading "FOR FURTHER INFORMATION CONTACT" set forth earlier in this document.

Issued in Washington, D.C. November 21, 1979.

Langhorne Bond,
Administrator.

[FR Doc. 79-36843 Filed 11-29-79; 8:45 am]

BILLING CODE 4910-13-M

14 CFR Parts 25 and 37

[Docket No. 18887; Amendment Nos. 25-49 and 37-46]

Aircraft Tires; Airworthiness and Performance Standards

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The purpose of these amendments is to incorporate updated and improved minimum performance standards applicable to main landing gear and nose wheel aircraft tires, and more comprehensive transport category airplane type design standards covering tire loads and speed ratings. These revisions are necessary in the interest of safety to meet increasingly severe tire operating conditions. The amendment for tire standards specifies a cutoff date after which tire manufacturers can no longer identify certain high-speed tires as approved under earlier standards.

DATE: Effective date: December 31, 1979.

FOR FURTHER INFORMATION CONTACT:
Mr. Raymond E. Ramakis, Regulatory Projects Branch, AVS-24, Safety Regulations Staff, Associate Administrator for Aviation Standards, Federal Aviation Administration, 800 Independence Ave., SW., Washington, D.C. 20591; telephone (202) 755-8716.

SUPPLEMENTARY INFORMATION:

Background

During recent years, there has been a series of accidents and incidents involving large commercial jet airplanes, particularly wide-body types, that involved failures of tires, wheels, brakes, and anti-skid devices. Some of these events resulted in complete destruction of three airplanes and in injuries and fatalities to occupants.

Beginning in 1975, the FAA placed strong emphasis on intensifying its ongoing safety surveillance efforts with respect to aircraft tires and began an analysis of tire failures and potential corrective actions. The FAA determined that complex landing gear systems, unprecedented high maximum aircraft operating weights, and the operation of all aircraft at higher taxi speeds over long taxi distances were among the significant factors in the tire failures.

As a result of its evaluation, the FAA developed tentative changes to the standards for both tires and wheel-brake assemblies. These efforts led to joint FAA-industry meetings in 1976 and 1977 during which the proposed standards were further revised and updated to reflect the latest technology and to meet operating conditions. Notice No. 78-16 (43 FR 57261; December 7, 1978) was issued to upgrade standards for aircraft wheels and wheel-brake assemblies and a final rule on that subject is published in this issue of the *Federal Register*. With respect to tires, on March 9, 1979, the FAA issued Notice No. 79-7 (44 FR 16430; March 19, 1979), which proposed regulatory changes directed at upgrading and improving the minimum performance standards applicable to main and nose wheel aircraft tires (§ 37.167 Aircraft Tires—TSO-C62b), and more comprehensive transport category airplane type design standards covering tire loads and speed ratings (§ 25.733). That Notice also proposed that all tires approved under the TSO procedures and manufactured after a specified future date meet the new standards.

This rulemaking action is one of a number of related steps in a program to resolve the tire problem. Though not part of this rulemaking action, the FAA has taken or has under consideration other actions intended to improve tire

maintenance practices and to update requirements for tires installed on airplanes currently in service. Advisory Circular No. 20-97, High Speed Tire Maintenance and Operational Practices, dated 1/28/77, and Maintenance Bulletin 32-3, (1/28/77) provide guidance material to assist the operating personnel concerned with tire maintenance. In the regulatory area, the FAA, in this issue of the *Federal Register*, is proposing an operating rule that would require certain airplanes to be equipped with tires meeting the new TSO standards by specified future dates.

Interested persons have been afforded an opportunity to participate in the making of these amendments and due consideration has been given to all matter presented. The more significant comments received in response to Notice No. 79-7 are discussed below. A number of substantive, editorial, and clarifying changes have been made to the proposed rules based on relevant comments received and on further review within the FAA. Except for minor editorial and clarifying changes and the changes discussed below, these amendments and the reasons for their adoption are the same as those contained in Notice 79-7.

These amendments implement the President's directive (Executive Order 12044) that regulations be as simple as possible and not impose unnecessary burdens on the economy or on the regulated public. They also are designed to promote the public interest by increasing safety and the efficiency of aircraft through use of improved equipment.

Discussion of Comments

Thirty-three individual sets of public comments were submitted in response to Notice 79-7. Many of the commenters submitted multiple lengthy recommendations. While the great majority of the commenters were in general agreement with the objectives of the proposals, a number of them suggested changes, requested clarification or guidance, and offered specific criticisms. Other commenters proposed changes that are beyond the scope of this rule making and they are not discussed here.

§ 25.733

Several commenters questioned the requirements in proposed § 25.733. Under proposed § 25.733(a), one commenter stated that the operational inflation pressure rating associated with the load rating should be provided. This is not practicable as these pressures, prescribed by the airframe

manufacturer, will vary depending upon the maximum operating gross weight of the airplane. Another commenter recommended a clarification of paragraph (a)(1) to include consideration of the most critical combination of loads up to maximum ramp weight and deletion of engine thrust and inertial effects. The commenter pointed out that because of variations in the position of the airplane center of gravity, the highest tire load condition is not always at maximum ramp weight of the airplane and that engine thrust and inertial effects are minor and should be considered under the proposed 7 percent load factor. Clearly, the most critical combination of airplane center of gravity and airplane weight (up to maximum ramp weight) should be considered in the establishment of the maximum load rating of the tire. However, the engine thrust and inertia effects should not be excluded from this established rating since, while these effects are minor, the 7 percent is intended to cover other unequal load conditions. Finally, in response to two other comments, paragraphs (a)(1) and (a)(2) are clarified with respect to the application of a single tire installation. With the changes noted, § 25.733(a) is adopted as proposed.

Under proposed § 25.733(b), one commenter suggested that paragraphs (b)(1), (b)(2), and (b)(3) be changed to reflect the critical airplane maximum weight, up to the maximum ramp weight and landing weight, as applicable. For the reasons discussed under paragraph (a), the most critical combination of airplane center of gravity and airplane maximum weight up to maximum ramp or maximum landing weight, as applicable, should be assessed in determining the tire load rating. One commenter suggested that the ability of a nose wheel tire to sustain an increased load by a factor of 1.5 in paragraph (b)(2) and (b)(3) be demonstrated while another commenter under paragraph (b)(3) recommended terminology change from "wheel" to "wheel-tires." However, service experience does not warrant imposing the burden of demonstrating the designed 1.5 nose wheel load factor and no justification was given for changing "wheels" to "wheel-tires". Section 25.733(b) is adopted as proposed with the changes noted.

Under proposed § 25.733(c), one commenter pointed out that paragraphs (c)(1) and (c)(2) would be meaningless unless a statement concerning an increase in tire inflation pressure (due to the 1.07 factor) was included. Since the proposed 7 percent load factor in

paragraph (c)(1) can only be maintained with a corresponding increase in inflation pressure, a provision for required inflation pressure necessary to assure the application of this derating factor is therefore included in the proposed operating rule published in this issue of the *Federal Register*. Although another commenter suggested clarifying the term "axle" with respect to additional configurations, the description of the landing gear axle is sufficiently clear to accommodate all multiple main wheel tire configurations. Two commenters stated that paragraph (c)(2) should include a reference to paragraph (b)(3) for nose wheel tires. One of the commenters also suggested that the word "tire" be added and that the paragraph include the 1.07 factor. In addition, one commenter questioned the absence of the 1.5 factor as proposed in paragraph (b). For clarity, paragraph (c)(2) should contain the paragraph reference (b)(3) and the additional word "tire" at the end of the paragraph. However, service experience does not warrant application of the 7 percent load factor to nose wheel tires. The 1.5 factor is not appropriate to main wheel tires since it is applied only to the nose wheel tire on the basis of additional takeoff and landing loads. Proposed § 25.733(c), (c)(1), and (c)(2) are adopted with the changes noted.

Recommended changes to proposed § 25.733(d) included a provision for allowing intentional tire contact from items such as rub strips, spin brakes, and guide rails. Another recommendation concerned the need to specify tire clearance on the basis of dynamic growth conditions. Paragraph (d) is revised to provide for intentionally designed contact as suggested. However, any other contact, considering both static and dynamic conditions, would not be allowed under this paragraph. One commenter stated that paragraph (d) should also apply to nonretractable landing gear systems. However, because of the different factors involved, the FAA will consider whether requirements for nonretractable gear may be necessary in future rulemaking actions.

Finally, a new paragraph was recommended by one commenter to provide that failure of any one tire on multiple wheel aircraft during takeoff, rejected takeoff, or landing should not cause hazardous loss of braking or directional control of the airplane. The objective of § 25.733, as well as that of § 25.735, is to preclude the hazardous loss of braking and airplane directional control due to system failure. The upgraded standard here being adopted

is directed at reducing single and multiple tire failures. Since the revision will accomplish this objective, the recommended change is not necessary.

§ 37.167 Aircraft Tires—TSO-C62c

No substantive comments were received on the applicability provisions in § 37.167(a) and it is adopted as proposed.

With respect to the marking requirement under proposed § 37.167(b), one commenter recommended in paragraph (b)(1) that the "brand name" be deleted as the manufacturer's name was considered sufficient. Another commenter recommended that, to be useful, the qualification test date or date of manufacture should be included. The deletion of brand name in lieu of manufacturer name is not appropriate, since a manufacturer may produce multiple brands. The need for dates is not justified since a qualification test date is already contained under approval records, and the date of manufacture can be readily obtained from the tire serial number. Under paragraph (b)(2), a commenter suggested adding the phrase "over 120 mph" after speed rating and adding "ply rating" in lieu of "load rating" since it is recognized by all standardization bodies. The same commenter suggested the deletion of "skid depth" and "manufacturer part number" as not being necessary.

The load rating should not be eliminated since, like the speed rating, it identifies the maximum operating load condition the tire should not exceed. The speed rating marking for a tire operating at 120 mph and below should not be deleted for the same reason. Contrary to the commenter's assertion, the skid depth and manufacturer's part number are required because they identify a given design and the characteristics of a given design which may affect tire performance. There is nothing to preclude a ply rating marking on a tire if desired by the tire manufacturer. Section 37.167(b) is adopted as proposed.

Proposed § 37.167(c) sets forth data requirements. One commenter recommended that the word "mold" be added before "skid depth" in proposed § 37.167(c)(1) because the mold skid-depth can be controlled. The requirement has been changed accordingly. Under the same paragraph one commenter suggested the addition of nominal and actual load radius, including tolerances, at rated load and inflation pressure. Another commenter suggested the submission of load-deflection curves or test results. To ensure completeness of data, it is

appropriate to add nominal and actual tire loaded radii including tolerances at rated load and inflation pressure. The submission of load deflection information is necessary to assure compatibility between tires installed on an aircraft. Proposed § 37.167(c)(1) is revised accordingly.

Section 37.167(c)(2) would require the tire manufacturer to furnish applicable maintenance and repair instructions. One commenter suggested that the tire manufacturer consult with the aircraft manufacturer to ensure necessary input to the instructions. Three other commenters objected outright to the proposal. One stated that this would imply mandatory use of that information by an operator or retread agency, both of whom are certificated by the FAA. Another suggested that recapping or retreading procedures should be in a separate document and not mixed in with new tire requirements. The third commenter suggested the deletion of the entire paragraph on the ground that retreading of aircraft tires is not a repair. According to the last commenter, the fact that retreaders use different materials, different numbers of reinforcing plies, different shaped molds, different tread patterns, different skid depth, etc., results in a product (retread) that is not a repaired new tire but a new product, one ingredient of which is a used carcass. On this basis it was suggested that a Technical Standard Order (TSO) governing the performance standards required for a retread should be issued. According to the commenter, this could be very similar to the new tire TSO and require virtually all of the certification required of a new tire.

Requiring a manufacturer to supply the information outlined in § 37.167(c)(2) is consistent with other regulations, such as §§ 23.1529, 25.1529, 27.1529, and 33.5, that require manufacturers to supply maintenance and inspection information with their products. The reason the criteria were outlined in the proposal was to identify specific maintenance and inspection information that a manufacturer must provide with its product. This information is intended to be made available to persons who maintain tires. It is not considered necessary that such information be the result of consultation with the airframe manufacturer. There are widely varying types of operations in the airlines and wide variation in airlines' capability to develop tire maintenance and inspection data. Not all users and repair facilities have this capability and of necessity must rely on data developed by the manufacturer as a basis to maintain and

inspect tires. To require a new tire to be built under one TSO and then maintained under a separate TSO is impractical. Under the maintenance performance rules of § 43.13 (a) and (b), a product after undergoing maintenance shall be at least equal to its original or properly altered condition. This makes it necessary for a tire on which maintenance was performed to continue to meet the requirements outlined in the TSO under which it was built. However, if a tire undergoing repair were altered, it would be considered a new product and it would be necessary for the tire to be tested for approval under the TSO and be approved for use on each aircraft of which it would be a part. Section 37.167(c)(2) is therefore adopted as proposed.

Section 37.167(d) proposed a two-year cutoff date after which all newly manufactured tires could no longer be identified as approved under earlier tire standards. One set of commenters recommended the exclusion of low-speed tires on the basis that retesting and related costs are not supported by adverse service experience. They contended that low-speed tires should be requalified only when the new ratings differ from those ratings on tires previously approved. Another group commenting on high speed tires recommended that the 2-year cutoff date be deleted, stating that the new TSO requirements should be applied to existing aircraft only on a case-by-case basis as supported by tire service history data. They further indicated that installing new and heavier tires on existing aircraft would require further analysis and flight tests to assure that the aircraft and systems would not be adversely affected. Several commenters of this group recommended extending the cutoff date to periods up to 5 years because of the limited dynamometer capacity available, costs, and possible tire shortages. One of the commenters pointed out that tires which the FAA wants to have qualified in a shorter time could be accomplished through the issuance of a proposed operating rule. Finally, two commenters questioned the application of the proposal to all tires when the preamble noted implementation of an operating rule affecting only certain aircraft.

Information contained in the many comments received in response to § 37.167(d) indicates that the proposed 2-year cutoff date for manufacturing of all tires to the old standards is too restrictive. Specifically, it would have a significant and adverse impact on the manufacture of low-speed tires which do not share the same failure history as

reported on high-speed tires. Based upon a review of service experience, which for low-speed tires has been good, and after further consideration, the FAA has determined that low-speed tires need not be requalified and should be excluded from the proposed cutoff requirements. This exclusion applies to all presently approved tires rated at speeds up to 160 mph.

In this issue of the *Federal Register*, the FAA is proposing an operational requirement for retrofit installation by certain rates of new high-speed tires (above 160 mph) on certain transport category airplanes whose tire problems and hazards are more clearly identified. That action, however, does not preclude the need to phase out the manufacture of tires approved under older standards for use on other aircraft operating at high gross weights or speeds or both. With respect to high-speed tires (rated over 160 mph), several commenters recommended extending the proposed 2-year cutoff date for manufacture under older standards. In their view, the 2-year date is too early and they specifically recommended that 3 years would be more realistic. The commenters pointed out that the cutoff must be consistent with availability of tires meeting the new standard. The controlling factors for this availability are the limited number of dynamometers industry-wide that can be used to test each tire model and the time required to redesign, retest, and then manufacture the large number of tire models involved. These and related factors, which are discussed in detail in the preamble of the notice published in this issue of the *Federal Register*, are used in arriving at dates by which certain transport category airplanes can be retrofitted with tires meeting the new standard. Based on the comments and data submitted, and upon reconsideration of the matter, the FAA has determined that discontinuance of manufacture of older high-speed tires by a date 3 years after the effective date of the new TSO standard is consistent with the development and manufacture of tires to the new standard to provide the necessary improvement in safety. This cutoff date will impose no undue economic burden in tire manufacturers or operators since it will provide adequate time for development of newly designed tires yet permit manufacture of older design tires to the extent necessary to assure an adequate supply pending completion of retrofit.

Standard for Aircraft Tires

Section 1.0 Purpose.

Two commenters recommended that the proposed new standard be limited to

tires for transport category airplanes and that Part 27 and Part 29 rotorcraft tires be excluded. One of the commenters contended that the proposed changes result from service experience on wide-bodied jet airplanes, and that they were unaware of comparable service experience on rotorcraft of any size or category. Another commenter stated similar reasons for excluding tires for Part 23 aircraft and suggested the establishment of two standards. The standards should not be limited to large aircraft since the requirements in the standard take into account the variation in tire performance as characterized by small and large aircraft. Moreover, as previously discussed, low-speed tires approved to older standards may continue to be manufactured under the terms of their original approval. Paragraph 1.0 is adopted as proposed.

Section 2.0 Scope.

One commenter recommended the inclusion of "inflation pressure" in connection with the load rating. While a rated inflation pressure must be established to provide for the design load rating of the tire, such information will be obtained by the FAA under the proposed data requirements in § 37.167(c). Therefore, there is no basis for including inflation pressure also under paragraph 2.0. Paragraph 2.0 is adopted as proposed.

Section 3.0 Material requirement.

One commenter recommended that the requirement also address processes which could equally affect performance. Another commenter pointed out the differences of materials between small and large aircraft tires and suggested that the suitability of materials should be predicated upon a substantiated service experience involving a tire of similar size and speed rating. The requirement is directed to the suitability of materials and the comments do not justify expanding the requirement to cover processes or explain why service experience should be limited in the narrow way suggested. Paragraph 3.0 is adopted as proposed.

Section 4.0 Design and construction.

No comments were received on individual requirements relating to unbalance, balance marker, and overpressure, paragraphs 4.1, 4.2, and 4.3, and they are adopted as proposed.

In proposed paragraph 4.4.1 of the standard relating to ambient temperature, several commenters objected to the optional use of analysis since it was claimed no analysis method is known. Another commenter

recommended that the paragraph be deleted or changed to read:
 " * * * shown by analysis that the physical properties of the tire materials have not been degraded by exposure of the tire to. * * * " That commenter pointed out that the recommended change would allow tire sample tests in lieu of requiring the use of facilities for full-scale tests which are not available. Another commenter questioned the severity of the proposed test temperatures and duration and questioned whether it would prohibit operations on aircraft cleared at lesser temperatures. In response to these comments, an optional analysis method should be allowed since an analysis method may exist or might be developed. The proposed tests need not nor were they intended to involve the performance of a full-scale tire. Therefore, the recommended change for applicable tests or analysis to substantiate the physical properties of the tire materials is adopted. Based on service experience, the 24-hour test period is not overly severe and the actual operational tire temperatures are consistent with those prescribed. Finally, although questioned by one commenter, the temperature limits specified are clearly stated.

In proposed paragraph 4.4.2 of the standard, concerning wheel rim heat, one commenter questioned the basis for the prescribed temperature and duration, while two other commenters objected to the application of the 300° F wheel bead seat temperature to nose wheel tires and low-speed tires. They suggested that paragraph 4.4.2 apply only to high-speed tires or that, in the case of nose wheel tires, they be identified for non-use on wheels subjected to operational temperatures in excess of 250° F. Not all aircraft tires operate within the proposed temperature environment and exposure period. To accommodate different tire designs which, by application, are not to be operated near the prescribed 300° F temperature, paragraph 4.4.2 is revised to allow low-speed tires or nose-wheel tires to be tested or analyzed at other highest wheel bead seat temperatures expected to be encountered during normal operations. Although questioned by one commenter, the provisions for an optional analysis method is retained for the reasons previously discussed in connection with ambient temperature. For consistency with paragraph 4.4.1 the requirement has been reworded to require that the physical properties of the tire materials not be degraded by exposure to the specified conditions.

Two commenters suggested wording changes to paragraph 4.5 concerning tread design, but these were not substantively justified or indicated as necessary for clarity. The paragraph is adopted as proposed.

Under paragraph 4.6, Slippage, one commenter questioned the basis for not allowing slippage within the first five cycles. The prescribed five dynamometer cycles have been an accepted industry practice to assure that the tire is properly fitted to the wheel during and prior to the initiation of tests. Experience obtained from past testing indicates that a period of five landing cycles is satisfactory. Paragraph 4.6 is adopted as proposed.

Considering it to be a necessary requirement, one commenter recommended addition of a new paragraph 4.7 covering an air leakage test. The recommended leakage test is an essential performance requirement and, since it is consistent with the current industry practice and will not result in any undue burden, the recommendation is adopted as new paragraph 4.7.

Section 5.0 Ratings.

Under paragraph 5.1, load ratings, two commenters recommended a change to provide that tires of proper load ratings be selected in accordance with the applicable FAR, but that the ratings for selection be established by a recognized industry standardization body or by the Administrator. The applicant should have the right to select or establish a tire load rating as long as it is in compliance with the applicable FAR sections. As provided under § 25.733, the Administrator approves the load rating once established. The recommendations which would provide that some third-party organization establish the tire load rating is, therefore, not accepted.

One commenter recommended that the manufacturer be required to make tire deflection information available to assure compatibility of tires on the same axle while two other commenters recommended that the deflection provision be deleted since it is not part of the load rating or required under the TSO. To eliminate the confusion between "tire deflection" and "percent deflection" one of the commenters recommended the addition of a new paragraph and term "loaded radius" which is defined as the distance between the axle centerline and the operating surface of a loaded tire. The commenter also recommended that the tire load rating be established by the tire manufacturer and approved by the Administrator. Another commenter suggested changing the second sentence

to identify tire deflection at loads up to 1.5 times the rated load and rated inflation pressure.

Under the standard a tire need not be designed to any specific load-deflection criterion. However, it is necessary that a tire's deflection characteristics at various loads and inflation pressures be identified to assure that a given tire design is compatible with another tire during its installation on an aircraft. In this issue of the *Federal Register*, the FAA is proposing as part of a new operating rule that the deflection between two tires mounted on a single axle be within acceptable limits at various operational loads up to maximum rated loads. The identified deflection information, which will form the basis for this acceptance, is required under § 37.167(c). Deflection at higher loads up to 1.5 times rated load must be included under this information. The description of tire deflection in terms of "percent deflection" can be deleted in view of a more appropriate "loaded radius" definition. Since, as provided under § 37.167(c), the manufacturer or TSO applicant must furnish the tire load rating, there is no basis for also referencing the tire manufacturer under paragraph 5.1. Therefore, the identification of a more appropriate loaded radius criterion is provided under a new paragraph 5.3 and § 37.167(c). Paragraph 5.1 is revised accordingly by deleting the sentences pertaining to percent deflections and radial distance.

Under paragraph 5.2, Rated inflation pressure, one commenter suggested a change to specify that the inflation pressure would be established by the tire manufacturer and approved by the Administrator. However, in view of the data requirements of § 37.167(c), there appears no need to further reference the manufacturer in paragraph 5.2. Two commenters recommended changing the ambient temperature to 68°F or to the extreme limits specified in paragraph 4.4.1 and identifying the rated inflation pressure under no load. The view to define the rated inflation pressure under either a rated load or no load was also shared by another commenter. In connection with these comments, a specific ambient or extreme temperature should not be specified since design temperatures differ among manufacturers. The recommendation to establish rated inflation pressure at extreme operating temperatures was unsupported. However, there is merit in the suggestion that the temperature on which a manufacturer bases a tire load and pressure rating should be identified. This is necessary to clarify the rated

inflation pressure which, in accordance with long standing operating practice, is based upon a no load condition. Paragraph 5.2 is revised accordingly.

Section 6.0 Dynamometer test requirements.

One commenter suggested that since tire deterioration is not necessarily visible, the paragraph should state " * * * without significant deterioration of the carcass, tread, or inflation pressure. * * * " A commenter also recommended that lack of such deterioration be verified by test. Another commenter recommended that since tread damage is permitted in the overload test, the paragraph should be changed to read " * * * other than normal expected wear except as noted in paragraph 6.3.3.3." Inclusion of the word "significant" would not result in a more specific requirement. Neither has sufficient justification been shown to require further test verification in view of the new acceptance criteria established under paragraph 6.3.3.3 for the single tire test specimen at the end of the overload test. However, as recommended, there is no basis to exclude tread damage which is permitted in the overload test. Paragraph 6.0 is revised accordingly.

One commenter suggested that paragraph 6.1.1 relating to tire test load be clarified by specifying "test surface" rather than "flywheel". However, the requirement proposed appears clear. In paragraph 6.1.2, one commenter recommended clarification with respect to inflation pressure. The commenter pointed out that rated inflation pressure applies to an unloaded tire and that the actual pressure under rated load will be higher for both the flat surface and the flywheel. Another commenter recommended that the percentage deflection at rated load should be the basis for determining the minimum loaded radius of the tire against the dynamometer. It was also recommended that the ambient temperature be identified. There is merit to the recommended clarification of paragraph 6.1.2 since the change would eliminate misinterpretation of test pressure as related to the rated inflation pressure identified under paragraph 5.3. Moreover, for the reasons previously discussed in connection with load ratings, there is reasonable basis for determining the minimum loaded radius and the identification of ambient temperatures as well as adopting the recommendation that the ambient temperature be identified by the manufacturer.

To provide a more realistic assessment of tire capability, two

commenters recommended in connection with paragraph 6.1.3 that the high-speed dynamometer tests, including the overload takeoff test, be conducted on one tire test specimen. The proposed option for allowing a new tire to be tested to the overload test requirements of paragraph 6.3.3.3 was based on the need to perform destructive inspection on the original test specimen which had been subject to previous taxi and takeoff test cycles in accordance with paragraph 6.3.3.2 and 6.3.3.4. While destructive type inspection allows for a positive assessment of internal deterioration of the tire, such an inspection procedure can be performed after the tire has been subjected to all the dynamometer tests including the overload test. The use of one test specimen throughout the total test series represents a realistic condition which assures the overload capability after having been previously subjected to operational takeoff and taxi cycles. Paragraph 6.1.3 has been revised accordingly.

In paragraph 6.2.1 concerning test temperatures for low-speed tires, several commenters recommended the deletion of " * * * " at any point on the tire " * * * " in the second sentence. One commenter stated that it is not necessary to determine the starting temperature at every point on the tire for the stated 90 percent of test cycles, and that the starting temperature for the remaining 10 percent of the cycles is unimportant. Two other commenters suggested that the "hottest point" be identified and used since this point controls its recycle time during the test and more nearly equates to the contained air temperature. There is merit to the suggestion that the test temperature be measured at the hottest point and the requirement has been changed accordingly. However, there is no basis for deleting the temperature requirements for 10 percent of test cycles since the prescribed conditions provide for test uniformity with respect to an acceptable minimum starting temperature. Finally, one commenter questioned the proposed temperature and recommended that a more realistic starting temperature should be obtained from known operational data and that it should be measured on the basis of contained air at the bottom of the tire. In this connection, a need exists to base temperatures on defined operating conditions. However, precise operational information is not readily available at this time, and the temperatures prescribed are intended to set safe limits. Research and development programs are presently

being undertaken to obtain useful realistic operating temperature data which can be correlated with laboratory tests.

Paragraph 6.2.2 of the standard states kinetic energy requirements. One commenter recommended that the FAA re-examine the need for retaining the deceleration (energy absorption) type dynamometer requirements, since dynamometers are presently available to test all tires to the takeoff profile specification. However, it does not appear advisable to eliminate the use of the energy absorption type dynamometer since information from manufacturers indicates that takeoff type equipment is not available for testing low-speed tires. As discussed under paragraph 6.3, the limited takeoff dynamometer facilities must be used for high-speed tire tests. Another commenter indicated that the energy conversion constant was in error and should be 0.011 as currently required. As discussed in the preamble of Notice 79-7, the proposed energy constant .011 (derived in terms of mph) was changed to .0113 to accommodate its use with an equivalent factor .015 (derived in terms of knots) established under the military tire specification MIL-T-5041C. This change will allow the testing of both civil and military tires to the same kinetic energy value. Both of the constants, .011 and .015, were derived on the basis of general assumptions relative to the absorption of kinetic energy by the brake and tire. The change to the more correct value is relatively small and will not be significant to manufacturers, particularly since tires (speed rating of 160 mph or less) may continue to be manufactured under previous approvals as discussed under § 37.167(d). Paragraph 6.2.2 is adopted as proposed.

In paragraph 6.2.4 of the standard three commenters pointed out an error which existed in the formula for computing kinetic energy absorption time. Paragraph 6.2.4 is revised to correct this error.

One commenter on paragraph 6.3 of the standard applicable to high-speed tires recommended a rewording to more accurately define the high-speed test condition and to require the airframe manufacturer to define and supply the takeoff details. The paragraph is revised to clarify and further define the high-speed test condition. However, the recommendation that the included test curves must be supplied by the airframe manufacturer is not accepted. Tire manufacturers may produce and qualify tires to any set of load-speed-time data they choose. The use of these tires is

adequately regulated by the provisions of FAR Part 25, which appears to meet the commenter's concern.

For the high-speed tire test temperature requirements of paragraph 6.3.1, two commenters recommended that the specified temperature be that of the hottest point of the carcass but not less than 120° F for the taxi test and not less than 105° F (as stated in paragraph 6.2.1) for all other tests. The recommendation was based on the higher tread temperature experienced in the laboratory as compared to in-service conditions. It was pointed out that the higher recycle temperature (120° F) may result in a tire design detrimental to economic field operation with no increase in safety and that 105° is used as the starting takeoff temperature under Department of Defense Specification MIL-T-5041G. Another commenter indicated that the 120° F starting temperature may not be representative and that a time between cycles should be established relating to actual operating conditions. Two commenters recommended that the 120° F apply to the tire air or carcass temperature at the start of 90 percent of the test cycles except for the overload test which should begin at 105° F. The FAA agrees that the measurement of tire temperature should be made at the hottest point. However, the 105° F starting temperature for takeoff cycles and alternate test permits achieving a peak test temperature consistent with actual peak temperature seen in service. Since a higher test temperature would not provide any clear benefit and could unnecessarily restrict design freedom, the 105° F starting temperature is adopted. For the remaining 10 percent of the cycles of each group, the starting temperature is specified as 80° F to provide a temperature consistent with the temperature gradient provided in paragraph 6.2.1.

In paragraph 6.3.2 of the standard, two commenters recommended a minimum reserve factor or 5 mph margin for each speed rating. However, current service experience does not support the need for such margins and no justification was provided by the commenters. The paragraph with its included table of values is adopted as proposed.

Paragraph 6.3.3 of the TSO standard specifies dynamometer cycles. One commenter suggested that the requirement be more realistic. A further comment recommended that the number of test cycles be representative of the number of flights an average tire lasts before its first retread and that the tests include landing cycles and yaw conditions. Another commenter

suggested that the requirement be clarified with respect to the number of tires tested. It was also suggested that the dynamometer cycle include side-load conditions. However, the increase in the number of cycles as originally proposed is sufficient to provide for a satisfactory assessment of the minimum performance of a tire considering both tread retention and overall carcass strength. With respect to the recommended side-load test, it is recognized that the lateral loading of tires during maneuvers such as turning does result in overload conditions which have a definite effect on tire life and performance. However, the prescribed overload tests under paragraph 6.3.3.3 and taxi tests under 6.3.3.4 provide for such conditions. Paragraph 6.3.3 is adopted as proposed.

In paragraph 6.3.3.1 covering symbol definitions, one commenter recommended that to be consistent with Figures 1 and 2, the symbol " L_2 " should be redefined as the rated load. Two other commenters suggested that " L_2 " be redefined as zero tire load or a load equal to 1.07 times the tire load at the maximum ramp weight. Another commenter recommended that the symbol " L_0 " be defined as the tire load at the start of test cycle. To provide a correct definition of symbols appropriate to Figures 1 and 2, the symbol " L_2 " is applied to a zero tire load and the symbol " L_0 " is applied to the tire load at the start of the cycle but not less than the rated load. The test loads required under this paragraph will, by definition, verify the rated load and, as applicable to main wheels under § 25.733(c)(1), take into account the 1.07 factor.

In response to a comment, paragraph 6.3.3.2 is amplified to indicate specifically the proper application of Figures 1 and 2 to takeoff cycles.

For the overload takeoff cycle of paragraph 6.3.3.3, one commenter recommended that a used tire (equal to half wear) be subjected to the test. In a similar vein, another commenter indicated it was unrealistic for a new tire to be used for the test when the object of the TSO is to clear the tire design for the first tread life. The comments are valid to the extent they recommend that some form of used tire, rather than a new tire meet the test. However, it is not necessary to specify a used tire. A tire that has been subjected to previous taxi and takeoff tests represents a realistic condition for assessing overload capability. The reason for this is to assure that the tire design has an overload capacity taking into account the tire service life. One

commenter pointed out that maintaining the tire rated inflation pressure is an ambiguous statement and suggested that at the completion of test and when the temperature is stabilized the tire should not lose pressure at a rate greater than 10 percent per hour. It was also suggested the paragraph include a statement that good condition of tread is not required. Two other commenters recommended that the tire should maintain its pressure integrity at the completion of test. The tire need not retain rated pressure at the end of test but should not lose more than 10 percent pressure within a 24-hour period. A 24-hour pressure retention period provides a more representative measure of acceptability. To assure the pressure integrity of the tire at the completion of test, paragraph 6.3.3.3 is revised to state that requirement.

In paragraph 6.3.3.4 relating to taxi cycles, one commenter recommended that the taxi test be followed immediately by the takeoff test to represent a more realistic operating condition. Another commenter suggested that the time between taxi cycles be established at more realistic conditions. While such "spectrum-type" taxi-takeoff tests represent one approach in assessing tire performance, there is insufficient information to indicate such tests approach realistic conditions or that they provide any improvement in ability to assess tire performance. The procedures set forth under this revised standard represent an upgrading of testing which is as stringent as can be achieved within the present state of the art. The FAA will continue to monitor developments in this field and the record of new tire performance, and may elect at some future time to further strengthen test requirements if it should be necessary to provide a higher level of performance with respect to improved tread retention and carcass strength. Paragraph 6.3.3.4 is adopted as proposed.

Under the alternate dynamometer tests proposed in paragraph 6.3.3.5, two commenters indicated that the equation in paragraph 6.3.3.5.2 represents a severe energy condition which is not supported by service experience. It was recommended that the tire be tested to the 160 mph speed but at the existing kinetic energy defined under paragraph 6.2.2. Two commenters also suggested that the paragraph be rewritten to provide that landing simulation tests be permitted only for tires with speed ratings of 160 mph or less. This need for limiting the alternate tests to 160 mph was pointed out by another commenter who indicated that some high-speed

tires (for use above 160 mph) existed which had carcass failures after they were qualified to the reverse takeoff (energy absorption) type test. The commenter questioned the availability of the load-speed-time data and recommended that it be made available by the manufacturers. One commenter pointed out that the 160 mph landing speed does not account for higher speed conditions that are associated with large turbojet aircraft. Finally, other commenters objected to the proposed change in testing tires up to 160 mph indicating that it would have an adverse economic impact on them and that the high cost of installing a new dynamometer to meet the 160 mph test requirement would have a resultant inflationary cost and not yield any additional benefit to the consumer.

Paragraph 6.3.3.5 provides an alternate and equivalent test for tires in the 120-160 mph range when the load-speed-time data needed for the takeoff type test (paragraph 6.3.1) has not been established. The energy level proposed for the alternate dynamometer test may be too conservative in view of current service experience which indicates that tires tested to existing energy levels perform satisfactorily. Since most new tire designs will be supported by load-speed-time data, the alternate test will retain the existing energy levels while requiring that the tire be tested at its maximum speed rating (160 mph) to demonstrate its high speed integrity. As provided in paragraph 6.3, all tires with speeds above 160 mph will be tested on the takeoff type dynamometer equipment. It should be noted that the costs of these tests to low-speed tire manufacturers are minimal since most low-speed tires are operated below the 120 mph limit even though they are rated at 160 mph under the existing standards. Therefore, the testing requirement is unchanged from the existing standard. In this connection, the requalification of tires with a speed range of 160 mph and below will not be required under § 37.167(d). Moreover, the current definition of low-speed tire (160 mph or less) has been changed to 120 mph or less, which will benefit the low-speed tire manufacturers with limited equipment capability and help assure that tires are tested at speeds and associated energy values which are experienced in service. The requirements are restated under a new paragraph to clarify the optional application to tires with ground speeds of 160 mph or less. Paragraph 6.3.3.5 as revised is redesignated and adopted as paragraph 6.3.4.

Section 7.0 Requalification tests.

Two commenters recommended that the word "carcass" be deleted from the listing of characteristics since the carcass of the lower ply rating tire need not be identical to that of the same size tire with a higher ply rating. The recommendation is adopted. One commenter suggested that high-speed tires be exempted from the paragraph unless there is a specified percent by which the load and speed should be lower. However, the FAA is not aware of service experience to indicate that a high speed tire with a lesser ply rating should be exempted. Finally, a commenter recommended that requalification of a low-speed tire to the new standards not be required if the speed, load, and inflation pressure ratings are the same as on a tire previously approved under the existing standard. As previously discussed in connection with revised paragraph § 37.167(d), such a provision is now effective for low-speed tires previously approved.

In the proposed Figure 1, one commenter suggested simulating the combined effects of the tire rolling loads together with the rolling distance required by a rejected takeoff at that speed. The same commenter recommended that the test load curve be above the aircraft load-speed-time curve by at least 7 percent. However, as previously discussed, the combined taxi-takeoff-landing test cycle represents one approach in assessing tire performance. The test procedures are considered to be at the present state-of-the-art and will provide a higher level of performance with respect to improved tread retention and carcass strength. It should be noted that the 1.07 factor applies solely to the load rating defined and established under § 25.733, and thus the added 7 percent must be included under the test load and appropriate load-speed-time curve as requested by the commenter. Another commenter recommended that Figure 2 be renumbered to Figure 1 with title changed to "Graphic Representation of a Universal Load-Speed-Time Cycle" to show the preferred method first. In addition, the commenter stated that in Figures 1 and 2, "L₀" should be "L₂", that "RD" should apply to "T₂", and that "T₂-T₁=3 seconds." The proposed figures are revised accordingly.

Adoption of the Amendment

Accordingly, Parts 25 and 37 of the Federal Aviation Regulations (14 CFR Parts 25 and 37), are amended as follows, effective December 31, 1979.

PART 25—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

1. By revising § 25.733 to read as follows:

§ 25.733 Tires.

(a) When a landing gear axle is fitted with a single wheel and tire assembly, the wheel must be fitted with a suitable tire of proper fit with a speed rating approved by the Administrator that is not exceeded under critical conditions and with a load rating approved by the Administrator that is not exceeded under—

(1) The loads on the main wheel tire, corresponding to the most critical combination of airplane weight (up to maximum ramp weight), center of gravity position, and the effect of engine thrust reacted by inertia at the airplane center of gravity; and

(2) The loads corresponding to the ground reactions in paragraph (b) of this section, on the nose wheel tire, except as provided in paragraphs (b)(2) and (b)(3) of this section.

(b) The applicable ground reactions for nose wheel tires are as follows:

(1) The static ground reaction for the tire corresponding to the most critical combination of airplane weight (up to maximum ramp weight) and center of gravity position with a force of 1.0g acting downward at the center of gravity. This load may not exceed the load rating of the tire.

(2) The ground reaction of the tire corresponding to the most critical combination of airplane weight (up to maximum landing weight) and center of gravity position combined with forces of 1.0g downward and 0.31g forward acting at the center of gravity. The reactions in this case must be distributed to the nose and main wheels by the principles of statics with a drag reaction equal to 0.31 times the vertical load at each wheel with brakes capable of producing this ground reaction. This nose tire load may not exceed 1.5 times the load rating of the tire.

(3) The ground reaction of the tire corresponding to the most critical combination of airplane weight (up to maximum ramp weight) and center of gravity position combined with forces of 1.0g downward and 0.20g forward acting at the center of gravity. The reactions in this case must be distributed to the nose and main wheels by the principles of statics with a drag reaction equal to 0.20 times the vertical load at each wheel with brakes capable of producing this ground reaction. This nose tire load may not exceed 1.5 times the load rating of the tire.

(c) When a landing gear axle is fitted with more than one wheel and tire assembly, such as dual or dual-tandem, each wheel must be fitted with a suitable tire of proper fit with a speed rating approved by the Administrator that is not exceeded under critical conditions, and with a load rating approved by the Administrator that is not exceeded by—

(1) 1.07 times the loads specified in paragraph (a)(1) of this section on each main wheel tire; and

(2) Loads specified in paragraphs (a)(2), (b)(1), (b)(2), and (b)(3) of this section on each nose wheel tire.

(d) Each tire installed on a retractable landing gear system must, at the maximum size of the tire type expected in service, have a clearance to surrounding structure and systems that is adequate to prevent unintended contact between the tire and any part of the structure or systems.

PART 37—TECHNICAL STANDARD ORDER AUTHORIZATIONS

2. By revising § 37.167 to read as follows:

§ 37.167 Aircraft Tires—TSO-C62c.

(a) *Applicability.* This technical standard order (TSO) prescribes the minimum performance standards that tires, excluding tailwheel tires, must meet in order to be identified with the applicable TSO marking. Tires which are to be so identified and which are manufactured on or after December 31, 1979, must meet the requirements of the "Federal Aviation Administration Standard for Aircraft Tires," effective December 31, 1979, set forth at the end of this section.

(b) *Marking.* In lieu of the marking requirements of § 37.7(d), aircraft tires must be legibly and permanently marked at least with the following:

(1) Brand name and the name or registered trademark of the manufacturer responsible for compliance.

(2) Speed rating, load rating, size, skid depth, serial number, and the manufacturer's part number and plant code.

(3) Applicable technical standard order (TSO) number.

(c) *Data requirements.* (1) In addition to the data specified in § 37.5, the manufacturer must also furnish to the Chief, Engineering and Manufacturing Branch, Federal Aviation Administration (or, in the case of the Western Region, the Chief, Aircraft Engineering Division), in the region in which the manufacturer is located, one copy, or copies as otherwise requested

by the regional office, of the following technical data: speed rating, load rating, rated inflation pressure, tire size, width, outside diameter, mold skid depth, nominal loaded radius at rated load and inflation pressure, permissible tolerance on the nominal loaded radius, the actual loaded radius of the test tire at rated load and inflation pressure, weight, static unbalance of the test tire, wheel rim designation, manufacturer's part number and, for high-speed tires, a load deflection curve at loads up to 1.5 times load rating, and a summary of the load-speed-time parameters used in the dynamometer tests. As used in this section, the term "high-speed tire" means a tire tested at a speed greater than 120 mph.

(2) The manufacturer must also furnish the applicable maintenance and repair instructions to the regional office identified in paragraph (c)(1) of this section. The maintenance data provided by the manufacturer must include inspection criteria for tires to determine eligibility for used tires to be continued in service. Recapping procedures must be included in the maintenance information along with any special repair methods applicable to the tire and special nondestructive inspection techniques.

(d) *Previously approved equipment.*

(1) Notwithstanding § 37.3 (a) and (b) of this part and the provisions of any specific previous TSO approval, after December 31, 1982, no person may identify or mark a tire having a speed rating above 160 mph with TSO numbers TSO-C62, TSO-C62a, or TSO-C62b.

(2) Aircraft tires, except for those specified in paragraph (d)(1) of this section, approved prior to December 31, 1979, may continue to be manufactured under the provisions of their original approval.

Federal Aviation Administration Standard for Aircraft Tires

1.0 *Purpose.* This document contains minimum performance standards for new aircraft tires, excluding tailwheel tires, that are to be identified as meeting the standards of TSO-C62c.

2.0 *Scope.* These minimum performance standards apply to aircraft tires having speed and load ratings that are established on the basis of the speed and loads to which the tires have been tested.

3.0 *Material requirement.* Materials must be suitable for the purpose intended. The suitability of the materials must be determined on the basis of satisfactory service experience or substantiating dynamometer tests.

4.0 *Design and construction.*

4.1 *Unbalance.* The moment (M) of static unbalance in inch ounces may not be greater than the value determined using the formula, $\text{moment (M)} = 0.025D^2$ rounded off to the

next lower whole number. D = maximum outside diameter of the tire in inches.

4.2 *Balance marker.* A balance marker, consisting of a red dot, must be affixed on the sidewall of the tire immediately above the bead to indicate the lightweight point of the tire. The dot must remain for any period of storage plus the original tread life of the tire.

4.3 *Overpressure.* The tire must withstand for at least 3 seconds a pressure of at least 4.0 times the rated inflation pressure (as specified in paragraph 5.2) at ambient temperature.

4.4 *Temperature.*

4.4.1 *Ambient.* It must be substantiated by applicable tests or shown by analysis that the physical properties of the tire materials have not been degraded by exposure of the tire to the temperature extremes of not higher than -40°F and not lower than $+160^\circ\text{F}$ for a period of not less than 24 hours at each extreme.

4.4.2 *Wheel rim heat.* It must be substantiated by the applicable tests or shown by analysis that the physical properties of the tire materials have not been degraded by exposure of the tire to a wheel bead seat temperature of not lower than 300°F for at least 1 hour, except that low-speed tires or nose-wheel tires may be tested or analyzed at the highest wheel-bead seat temperatures expected to be encountered during normal operations.

4.5 *Tread design.* Changes in materials that affect performance or changes in number or location of tread ribs and grooves or skid depth increases, made subsequent to the tire qualification, are major changes and must be substantiated by dynamometer tests in accordance with paragraph 6.0.

4.6 *Slippage.* Tires tested in accordance with the dynamometer tests provided by paragraph 6.0 may not slip on the wheel rim during the first five dynamometer cycles. Slippage that subsequently occurs may not damage the tube, valve, or the air seal of the tire bead of tubeless tires.

4.7 *Leakage.* After an initial 12-hour minimum stabilization period, the tire must be capable of retaining air pressure with a loss of pressure not exceeding 5 percent in 24 hours from the initial pressure equal to the rated inflation pressure.

5.0 *Ratings.*

5.1 *Load ratings.* The load ratings of aircraft tires must be established in accordance with the provisions under §§ 23.733, 25.733, 27.733, and 29.733 of this chapter, in effect on December 31, 1979, as appropriate.

5.2 *Rated inflation pressure.* The rated inflation pressure must be established at an identified ambient temperature on the basis of the rated load as established under paragraph 5.1.

5.3 *Loaded radius.* The loaded radius is defined as the distance from the axle centerline to a flat surface for a tire initially inflated to the rated inflation pressure and then loaded to its rated load against the flat surface. The nominal loaded radius, the allowable tolerance on the loaded radius, and the actual loaded radius for the test tires must be identified.

6.0 *Dynamometer test requirements.* The tire may not fail the applicable dynamometer

tests specified herein or have visible signs of deterioration other than normal expected tread wear except as provided in paragraph 6.3.3.3.

6.1 *General.* The following conditions apply to both low-speed and high-speed tires when these tires are subjected to the applicable dynamometer tests:

6.1.1 *Tire test load.* Unless otherwise specified herein for a particular test, the tire must be forced against the dynamometer flywheel at not less than the rated load of the tire during the entire roll distance of the test.

6.1.2 *Test inflation pressure.* The test inflation pressure must be the pressure required at an identified ambient temperature to obtain the same loaded radius against the flywheel of the dynamometer as the loaded radius for a flat surface as defined in paragraph 5.3 of this standard. Adjustments to the test inflation pressure may not be made to compensate for increases due to temperature rise occurring during the tests.

6.1.3 *Test specimen.* A single tire specimen must be used in the applicable dynamometer tests specified herein.

6.2 *Low speed tires.* Tires operating at ground speeds of 120 mph or less must withstand 200 landing cycles on a dynamometer at the following test temperature and kinetic energy and using either test method A or test method B.

6.2.1 *Test temperature.* The temperature of the air contained in the tire or of the carcass measured at the hottest point of the tire must be not lower than 105°F at the start of at least 90 percent of the test cycles. For the remaining 10 percent of the test cycles, the contained air or carcass temperature must be not lower than 80°F at the start of each cycle. Rolling the tire on the flywheel is acceptable for obtaining the minimum starting temperature.

6.2.2 *Kinetic energy.* The kinetic energy of the flywheel to be absorbed by the tire must be calculated as follows:

$KE = CWV^2 = 162.7W =$ Kinetic energy in foot pounds.

where

$C = 0.0113$,

$W =$ Load rating of the tire in pounds,

$V = 120$ mph.

6.2.3 *Test method A—variable mass flywheel.* The total number of dynamometer landings must be divided into two equal parts having speed ranges shown below. If the exact number of flywheel plates cannot be used to obtain the calculated kinetic energy value or proper flywheel width, a greater number of plates must be selected and the dynamometer speed adjusted to obtain the required kinetic energy.

6.2.3.1 *Low-speed landings.* In the first series of 100 landings, the maximum landing speed is 90 mph and the minimum unlanding speed is 0 mph. The landing speed must be adjusted so that 56 percent of the kinetic energy calculated under paragraph 6.2.2 will be absorbed by the tire. If the adjusted landing speed is calculated to be less than 80 mph, the following must be done: The landing speed must be determined by adding 28 percent of the kinetic energy calculated under paragraph 6.2.2 to the flywheel kinetic energy at 64 mph, and the unlanding speed determined by subtracting 28 percent of the kinetic energy calculated under paragraph 6.2.2 from the flywheel kinetic energy at 64 mph.

6.2.3.2 *High-speed landings.* In the second series of 100 landings, the minimum landing speed is 120 mph and the nominal unlanding speed is 90 mph. The unlanding speed must be adjusted as necessary so that 44 percent of the kinetic energy calculated under paragraph 6.2.2 will be absorbed by the tire.

6.2.4 *Test method B—fixed mass flywheel.* The total number of dynamometer landings must be divided into two equal parts having speed ranges indicated below. Each landing must be made in a time period, T , calculated so that the tire will absorb the kinetic energy determined under paragraph 6.2.2. The time period must be calculated using the equation:

$$T_C = \frac{KE_C}{\left(\frac{KE_W(UL) - KE_W(LL)}{T_L(UL) - T_L(LL)} \right) - \left(\frac{KE_W(UL) - KE_W(LL)}{T_W(UL) - T_W(LL)} \right)}$$

For the 90 mph to 0 mph test, the equation reduces to:

$$T_C = \frac{KE_C}{\left(\frac{KE_W(UL)}{T_L(UL)} \right) - \left(\frac{KE_W(UL)}{T_W(UL)} \right)}$$

where:

$T_C =$ Calculated time, in seconds, for the tire to absorb the required kinetic energy.

$KE_C =$ Kinetic energy, in foot pounds, the tire is required to absorb during each landing cycle.

$KE_W =$ Kinetic energy, in foot pounds, of the flywheel at given speed.

$T_L =$ Coast down time, in seconds, with rated tire load on flywheel.

$T_W =$ Coast down time, in seconds, with no tire load on flywheel.

(UL) = Subscript for upper speed limit.

(LL) = Subscript for lower speed limit.

6.2.4.1 *Low-speed landings.* In the first series of 100 landings, the tire must be landed

against the flywheel with the flywheel having a peripheral speed of not less than 90 mph. The flywheel deceleration must be constant from 90 mph to 0 mph in the time T_C .

6.2.4.2 *High-speed landings.* In the second series of 100 landings, the tire must be landed against the flywheel with the flywheel having a peripheral speed of not less than 120 mph. The flywheel deceleration must be constant from 120 mph to 90 mph in the time T_C .

6.3 *High-speed tires.* Except as provided in the alternate test, tires operating at ground speeds greater than 120 mph must be tested on a dynamometer in accordance with paragraph 6.3.3. The curves to be used as a basis for tests under paragraph 6.3.3 must be established in accordance with the provisions of §§ 23.733 or 25.733, as appropriate. The load at the start of the test must be equal to the rated load of the tire. The load at any time during the test must be equal to the load shown on the established curve at that speed times the rated load of the tire divided by the initial load-speed-time curve load of the tire. Alternate tests involving a landing sequence for tires operating at ground speeds greater than 120 mph and not over 160 mph are set forth in paragraph 6.3.4.

6.3.1 *Test temperature.* The temperature of the air contained in the tire or of the carcass measured at the hottest point of the tire must be not lower than 120°F at the start of at least 90 percent of the test cycles specified in paragraph 6.3.3.4 and at least 105°F at the start of the overload test (6.3.3.3) and of at least 90 percent of the test cycles specified in paragraphs 6.3.3.2 and 6.3.4. For the remaining 10 percent of each group of cycles, the contained air or carcass temperature must be not lower than 80°F at the start of each cycle. Rolling the tire on the dynamometer is acceptable for obtaining the minimum starting temperature.

6.3.2 *Dynamometer test speeds.* Applicable dynamometer test speeds for corresponding maximum ground speeds are as follows:

Maximum ground speed of aircraft, mph		Speed rating of tire mph	Minimum dynamometer speed at S_u , mph
Over	Not Over		
120	160	160	160
160	190	190	190
190	210	210	210
210	225	225	225
225	235	235	235
235	245	245	245

For ground speeds over 245 mph, the tire must be tested to the maximum applicable load-speed-time requirements and appropriately identified with the proper speed rating.

6.3.3 *Dynamometer cycles.* The test tire must withstand 50 takeoff cycles, 1 overload takeoff cycle, and 10 taxi cycles described below. The sequence of the cycles is optional.

6.3.3.1 *Symbol definitions.* The numerical values which are used for the following symbols must be determined from the applicable airplane load-speed-time data:

$L_o =$ Tire load at start of takeoff, pounds (not less than rated load).

L_1 = Tire load at rotation, pounds.

L_2 = Zero tire load (liftoff).

RD = Roll distance, feet.

S_0 = Zero tire speed.

S_1 = Tire speed at rotation, mph.

S_2 = Tire speed at liftoff, mph (not less than speed rating).

T_0 = Start of takeoff.

T_1 = Time to rotation, seconds.

T_2 = Time to liftoff, seconds.

6.3.3.2 Takeoff cycles. For these cycles the loads, speeds, and distance must conform to either Figure 1 or Figure 2. Figure 1 defines a test cycle that is generally applicable to any aircraft. If Figure 2 is used to define the test cycle, the loads, speeds, and distance must be selected based on the most critical takeoff conditions established by the applicant.

6.3.3.3 Overload takeoff cycle. The cycle must duplicate the takeoff cycles specified under paragraph 6.3.3.2 except that the tire load through the cycle must be increased by a factor of at least 1.5. Upon completion of the overload takeoff cycle, the tire must be capable of retaining air pressure with the loss of pressure not exceeding 10 percent in 24 hours from the initial test pressure. Good condition of the tire tread is not required.

6.3.3.4 Taxi cycles. The tire must withstand at least 10 taxi cycles on a dynamometer under the following test conditions:

Number of test cycles	Minimum tire load, lbs.	Minimum speed mph	Minimum roll distance, ft.
8	Rated load.....	40	35,000
2	1.2 times rated load.	40	35,000

6.3.4 Alternate dynamometer tests. For tires with a speed rating of 160 mph, test cycles which simulate landing may be used in lieu of the takeoff cycles specified in paragraphs 6.3.3.2 and 6.3.3.3. The tire must withstand 100 test cycles at rated load in accordance with paragraph 6.3.4.1 followed by 100 test cycles at rated load in accordance with paragraph 6.3.4.2.

6.3.4.1 Low-speed landings. In the first series of 100 landings, the test procedure for low-speed landings established under paragraphs 6.2.3 or 6.2.4, as appropriate, must be followed.

6.3.4.2 High-speed landings. In the second series of 100 landings, the test procedure for low-speed landings established under paragraphs 6.2.3 or 6.2.4, as appropriate, must be followed, except that the tire must be landed against the flywheel rotating at a speed of 160 mph with the rated load applied for the duration of the test. The unlanding speed must be adjusted as necessary in order that 44 percent of the kinetic energy, as calculated in paragraph 6.2.2, is absorbed by the tire during the series of tests.

BILLING CODE 4910-13-M

FIGURE 1

GRAPHIC REPRESENTATION OF A UNIVERSAL LOAD-SPEED-TIME TEST CYCLE

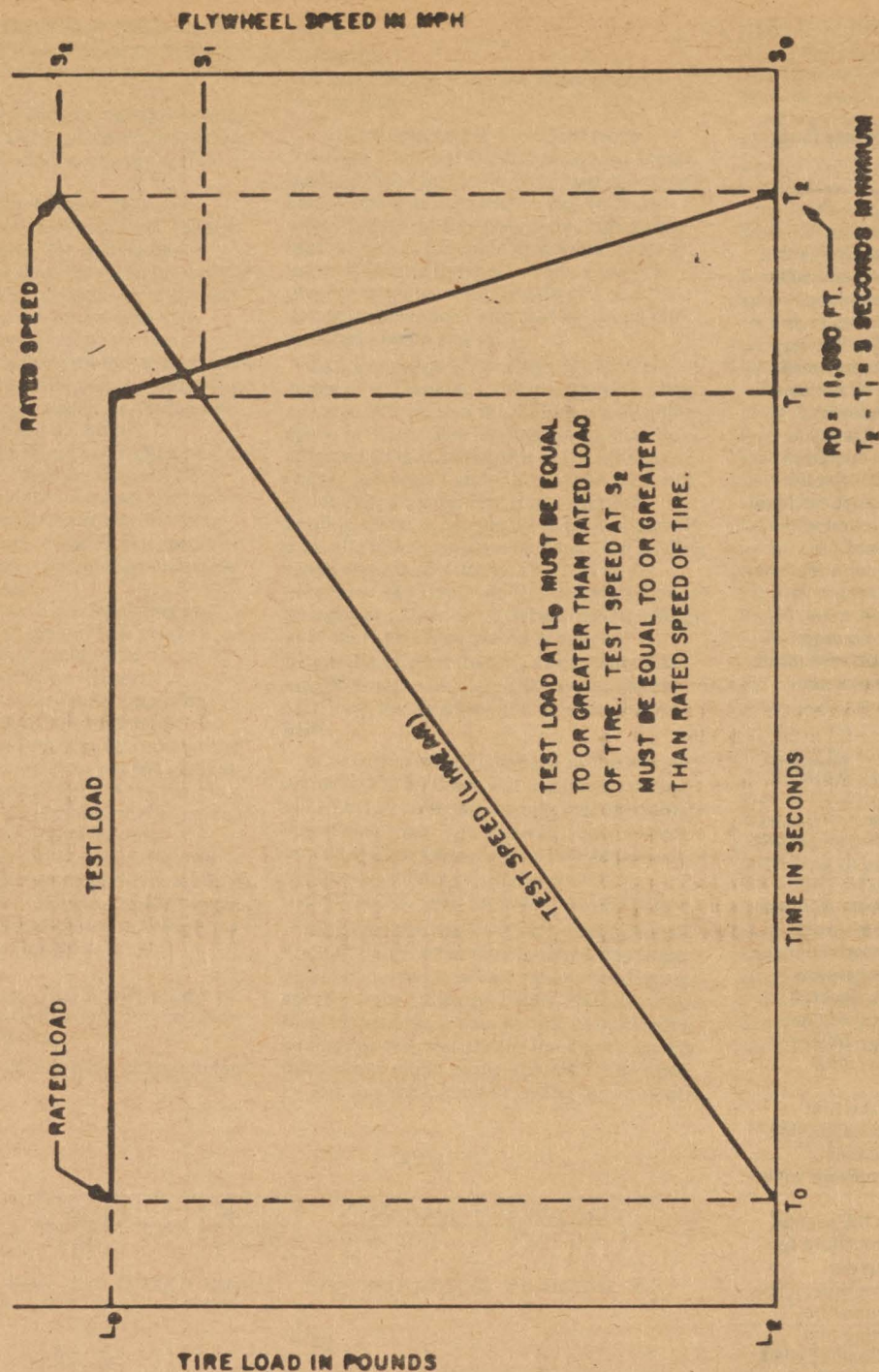
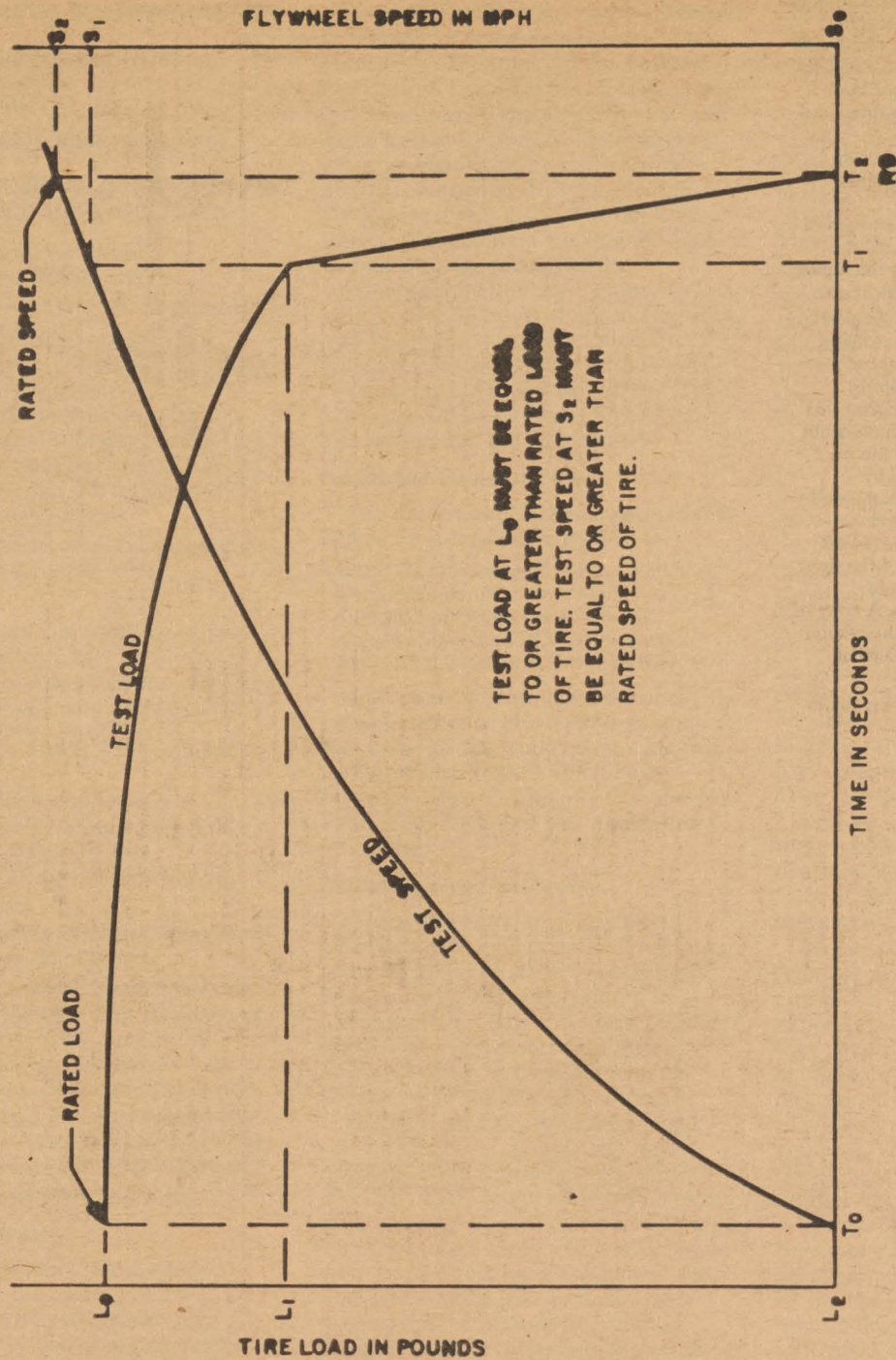


FIGURE 2

GRAPHIC REPRESENTATION OF A RATIONAL LOAD-SPEED-TIME TEST CYCLE



7.0 *Requalification tests.* Requalification in accordance with paragraph 6.0 of a given load rated tire required as a result of a tread design or material change will automatically qualify the same changes in a lesser load rated tire of the same size, speed rating, and skid depth provided—

7.1 The lesser load rated tire has been qualified to the applicable requirements specified in this standard; and

7.2 The ratio of qualifications testing load to rated load for the lesser load rated tire does not exceed the same ratio for the higher load rated tire at any given test condition.

(Secs. 313(a), 601 and 603, Federal Aviation Act of 1958, as amended (49 U.S.C. 1354(a), 1421 and 1423); sec. 6(c), Department of Transportation Act (49 U.S.C. 1655(c)).)

Note.—The FAA has determined that this document involves a regulation which is not considered to be significant under the procedures and criteria prescribed by Executive Order 12044 and as implemented by the Department of Transportation Regulatory Policies and Procedures (44 FR 11034, February 26, 1979). A copy of the final evaluation prepared for this action is contained in the regulatory docket. A copy of it may be obtained by contacting the person identified under the caption "For Further Information Contact".

Issued in Washington, D.C., on November 21, 1979.

Langhorne Bond,

Administrator.

[FR Doc. 79-36644 Filed 11-28-79; 8:45 am]

BILLING CODE 4910-13-M

DEPARTMENT OF TRANSPORTATION**Federal Aviation Administration****14 CFR Part 91**

[Docket No. 19793; Notice No. 79-20]

PART 91—GENERAL OPERATING AND FLIGHT RULES AIRPLANE TIRES**AGENCY:** Federal Aviation Administration (FAA), DOT.**ACTION:** Notice of proposed rulemaking.**SUMMARY:** This notice proposes to amend the general operating and flight rules to require the installation of improved airplane tires on certain turbojet-powered transport category airplanes. This notice results from incidents involving tire failures on commercial jet airplanes.**DATES:** Comments must be received on or before February 27, 1980.**ADDRESS:**

Comments on this proposal may be mailed in duplicate to:

Federal Aviation Administration, Office of the Chief Counsel, Attn: Rules Docket (AGC-24), Docket No. 19793, 800 Independence Ave., S.W., Washington, D.C. 20591.

Or delivered in duplicate to:

Room 916, 800 Independence Ave., S.W., Washington, D.C. 20591.

Comments delivered must be marked: Docket No. 19793.

Comments may be inspected at Room 916 between 8:30 a.m. and 5:00 p.m.

FOR FURTHER INFORMATION CONTACT:

Mr. Raymond R. Ramakis, Regulatory Projects Branch, AVS-24, Safety Regulations Staff, Associate Administrator for Aviation Standards, Federal Aviation Administration, 800 Independence Ave., S.W., Washington, D.C. 20591, Telephone (202) 755-8716.

SUPPLEMENTARY INFORMATION:**Comments Invited**

Interested persons are invited to participate in the making of the proposed rule by submitting such written data, views, or arguments as they may desire. Comments relating to any significant environmental or economic impact that might result because of the adoption of this proposal may also be submitted. Communications should identify the regulatory docket or notice number and be submitted in duplicate to the address specified above. All communications received on or before the closing date for comments specified above will be considered by the Administrator before taking action on the proposed rule. The proposal

contained in this notice may be changed in the light of comments received. All comments submitted will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested persons. A report summarizing each FAA public contact concerned with the substance of the proposal will be filed in the Rules Docket. Commenters wishing the FAA to acknowledge receipt of their comments submitted in response to this notice must submit with those comments a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket No. 19793." The postcard will be date and time stamped and returned to the commenter.

Additional Copies of Notice

Any person may obtain a copy of this NPRM by submitting a request to:

Federal Aviation Administration, Office of Public Affairs, Attention: Public Information Center, APA-430, 800 Independence Ave., S.W., Washington, D.C. 20591, Telephone (202) 426-8058.

Each communication must identify the notice number of this NPRM. Persons interested in being placed on a mailing list for future NPRM's should also request a copy of Advisory Circular No. 11-2 which describes the application procedure.

Background and Discussion

During recent years, a number of accidents and incidents involving large commercial jet airplanes, particularly wide-body types, have resulted from failures of tires. Many of these accidents resulted in injuries and fatalities to occupants and, in three of them, the airplane was completely destroyed.

Beginning in 1975, the FAA placed special emphasis on intensifying its ongoing safety surveillance of aircraft tires. The FAA began an analysis of tire failures and potential corrective actions. The FAA found that the advent of large wide-body type aircraft designed with complex landing gear systems, their unprecedented high operating gross weights, and the operation of aircraft at higher taxi speeds over long taxi distances were among the significant factors in the tire failures.

The FAA, in this issue of the Federal Register, is adopting standards to upgrade and improve the minimum performance standards applicable to main and nose wheel aircraft tires (§ 37.167, Aircraft Tires—TSO-C62c) and more comprehensive transport category airplane type design standards covering tire loads and speed ratings. These new standards also specify that after 1982, tires with a speed rating

above 160 mph manufactured under a TSO approval must meet the new TSO standards.

To minimize tire failures due to severe tire operating conditions, the FAA is proposing to require the installation of airplane tires meeting new TSO-C62c on certain turbojet-powered transport category airplanes by specified dates. These airplanes, both wide-body and standard-body designs, have been selected on the basis of a significant number of tire failure occurrences reported during the period from January 1973 to April 1978. During this period, the average fleet size was 313 wide-body airplanes, and 46 occurrences were reported for those designs. During the same period, the average fleet size was 1,624 standard-body airplanes, and 86 occurrences were reported for those designs. In 1977, the FAA issued guidance material to assist maintenance personnel concerned with tire maintenance (Advisory Circular No. 20-97 and Maintenance Bulletin 20-97). Notwithstanding that effort, tire failures continue to occur in service. The adverse tire service experience indicates that airplanes operating at high weights and speeds are more apt to have safety-related tire failures. Therefore, the FAA is proposing that these airplanes be equipped and operated with tires meeting new TSO-C62c at the earliest possible dates after these new tires can become available.

Because of the higher tire failure rate (number of tire failures compared to the number of airplanes in the fleet) experience with wide-body airplanes, they should be in the first to be equipped with improved tires. Accordingly, the FAA is proposing to require all wide-body airplanes to be equipped with improved tires by December 31, 1982. All standard-body airplanes would have to be equipped with improved airplane tires by December 31, 1983. These dates are selected based on information provided by the tire manufacturers and readers, and on estimates of recent utilization of tires of 2,444 turbojet-powered transport category airplanes registered in the U.S. These airplanes represent nine airplane types consisting of three wide-body models (343 airplanes) and six standard-body models (2,101 airplanes). Data was not available for three models, Groupment d' Interest Economique Airbus Industry Type A300, and General Dynamics Models 22 and 30. However, since there are only 14 such airplanes in the current U.S. fleet, their exclusion would not alter these dates. It is estimated that the 343 wide-body airplane fleet requires 10

tire models and 18,000 tires in the system (on airplanes, at station inventory, and in the recap cycle) to operate. The 2,101 standard-body airplane fleet requires 32 tire models and 54,000 tires in the system to operate. This 2,444 airplane fleet uses approximately 23,000 casings and 93,000 retreads per year. The proposed dates represent the shortest time (based on information available to the FAA) necessary for industry, considering current industry capability, to redesign, test, obtain approval, prepare for production, produce tires, and to equip the fleet. The following is a brief description of these steps and the estimated time required to complete them for one tire:

1. Redesign.—This step requires testing (2 weeks) the existing tire against the new TSO standards to determine whether the tire meets the new standards (this step may require testing on a dynamometer) and redesigning, if necessary, the tire to meet the new standards (about 4 weeks.). This includes analysis and selection of a new combination of tire compound, tread depth, number of plies, and materials, and the development of the design data and building the prototype tires.

2. Test.—This step requires testing the newly developed tire to the new TSO standards and requires 2 weeks to complete. This step requires testing on a dynamometer.

3. Obtain approval.—This step requires the submittal of data to the FAA for approval to produce the newly developed tire. The time required to review and approve the data, and to process the approval is 4 weeks.

4. Prepare for production.—This step makes ready the resources to produce tires. The time required to acquire the materials, schedule the materials, men, and machines is 4 weeks.

5. Produce tires.—At this stage of the process the manufacturer can achieve a tire production rate above the tire utilization rate.

6. Equip the airplanes.—This is the most time-consuming of all the steps. It involves the delivery of tires from manufacturer to carrier, installation of the tire, time to use the first tread, the delivery of casings to the retreader, time for the retreader to develop the retread process, the delivery of retreads to the test facility, testing on a dynamometer, and time to obtain approval of the retread process from the FAA. On the average, 30 weeks are required to accomplish this step.

The time frame required to accomplish the above-listed steps is 48 weeks and is a representative time period which may be shorter for some of

the 42 (the 10 tire models for the wide-body airplanes plus the 32 tire models for the standard-body airplanes) tire models and longer for others, but this time frame is not achievable for all 42 models simultaneously. Since existing industry facilities are limited (i.e., two tire manufacturers, three retreaders, and three dynamometers capable of applying the loads necessary to run the overload test require by the new TSO standards), these steps must be undertaken sequentially for the individual tire models. Industry estimates that manufacturers can achieve scheduling efficiencies to bring one redesigned tire to a production-ready stage every 10 weeks. If, based upon information available to the FAA, 17 of 42 tire models must be redesigned, the manufacturers would not be able to start production on the last tire in that sequence until 170 weeks past the issue date of the rule, and retreaders would not be able to start making retreads available until about 200 weeks past the issue date of the rule. Therefore, the last tire would be introduced by the retreaders around December 31, 1983, which is the cutoff date proposed for equipping the standard-body airplanes with improved airplane tires. The FAA expressly solicits comments on each of the proposed dates and justification of any changes commenters which to recommend.

To realized the safety benefits from use of tires meeting the new standards, the proposed rule would also require that the load rating for tires to be retrofitted on existing airplanes be determined in the same manner as that for new type design airplanes under new § 25.733(c)(1) (published concurrently in this issue of the Federal Register.) Comments received in response to the notice of proposed rule making for new § 25.733 (Notice 79-7) indicated a need to identify the inflation pressure necessary to maintain the 7 percent additional load factor required for multiple-mounted tire-wheel assemblies on a single axle as specified in § 25.733(c)(1). Since the load rating of a tire is dependent upon a corresponding inflation pressure, the pressure associated with the 7 percent load factor must be attained to assure that a margin of safety exists for any operational load. The FAA investigation of tire failures has also revealed that unless the deflection characteristics of adjacent tires mounted on a single axle are within a relatively narrow range, a condition of tire overload can occur. For this reason, the FAA is requiring under TSO-C62c the submittal of tire deflection data. This notice proposes to use that

information to assist in the safe matching of tires that are to be installed on a single axle. The proposed 7 percent deflection is based on the manufacturing variances that have been allowed under the previous TSO and that are allowed under the new TSO.

Request for Economic Data

The FAA has considered the time required to redesign, test, obtain approval, prepare for production, produce tires, and to equip the fleet with improved airplane tires. The cost impact analysis prepared by the FAA to assess the costs of equipping wide-body and standard-body airplanes with improved airplane tires within the shortest achievable time period considered such factors as the cost to equip the fleet with improved tires, the cost of replacing working inventories with higher-priced new tires, and the loss of the remaining value of old standard tires still in the working inventory after the proposed date to equip the airplanes with improved tires.

Based on the information available to the FAA at this time, the cost of complying with the proposal for wide-body airplanes is estimated, using a fleet size of 343 airplanes with an average annual utilization rate of 1,121 landings per airplane, at \$5,260,000 with an additional annual follow-on cost of \$270,000, the equivalent of \$0.14 per tire per landing. The cost for standard-body airplanes is estimated, using a fleet size of 2,101 airplanes and the actual airplane utilization during 1978 (weighted average of 2,296 landings per airplane) at \$9,400,000 with an additional annual follow-on cost of \$950,000, the equivalent of approximately \$0.08 per tire per landing.

The FAA is aware that much detailed economic impact information is exclusively in the possession of aircraft tire manufacturers, aircraft tire retreaders, aircraft owners, and aircraft operators. Accordingly, comments concerning economic impact of the proposal are strongly encouraged.

In submitting comments, each owner, operator, and manufacturer should specify the proposal's anticipated economic effect on its operations or production. If an organization desires to submit economic data on behalf of groups of operators or manufacturers, a detailed breakdown of the anticipated effect on each member of the group is requested.

The Proposed Amendment

Accordingly, the Federal Aviation Administration proposes to amend Part 91 of the Federal Aviation Regulations

(14 CFR Part 91) by adding new § 91.59 to read as follows:

§ 91.59 Airplane tires.

(a) After December 31, 1982, no person may operate a wide-body airplane type certificated with high-speed main wheel tires (rated over 160 miles per hour), unless it is equipped with tires meeting TSO-C62c that have a load rating in accordance with § 25.733(c)(1) of this chapter in effect on: December 31, 1979.

(b) After December 31, 1983, no person may operate a standard-body airplane type certificated with high-speed main wheel tires (rated over 160 miles per hour), unless it is equipped with tires meeting TSO-C62c that have a load rating in accordance with § 25.733(c)(1) of this chapter in effect on: December 31, 1979.

(c) At all operating loads up to the load rating of the tire, each tire required under paragraph (a) or (b) of this section must be operated—

(1) At the tire inflation pressure necessary to maintain at least 1.07 times the operational load; and

(2) At a deflection which is within 7 percent of the deflection of any other tire-wheel combination mounted on the same axle.

(d) For the purpose of this section, wide-body airplanes include, but are not necessarily limited to, the Boeing Model 747, Lockheed Model L-1011, and McDonnell Douglas Model DC-10. Standard-body airplanes, include but are not necessarily limited to, the Boeing Models 727 and 737, General Dynamics Model 22, and McDonnell Douglas Models DC-8 and DC-9.

(Secs. 313(a), 601 and 603, Federal Aviation Act of 1958, as amended (49 U.S.C. 1354(a), 1421, and 1423; sec. 6(c), Department of Transportation Act (49 U.S.C. 1655(c); 14 CFR 11.45).)

Note.—The FAA has determined that this document involves a proposed regulation which is not considered to be significant under the procedures and criteria prescribed by Executive Order 12044 and as implemented by the Department of Transportation Regulatory Policies and Procedures (44 FR 11034, February 26, 1979). A copy of the draft evaluation prepared for this action is contained in the regulatory docket. A copy of it may be obtained by contacting the person identified under the caption "For Further Information Contact."

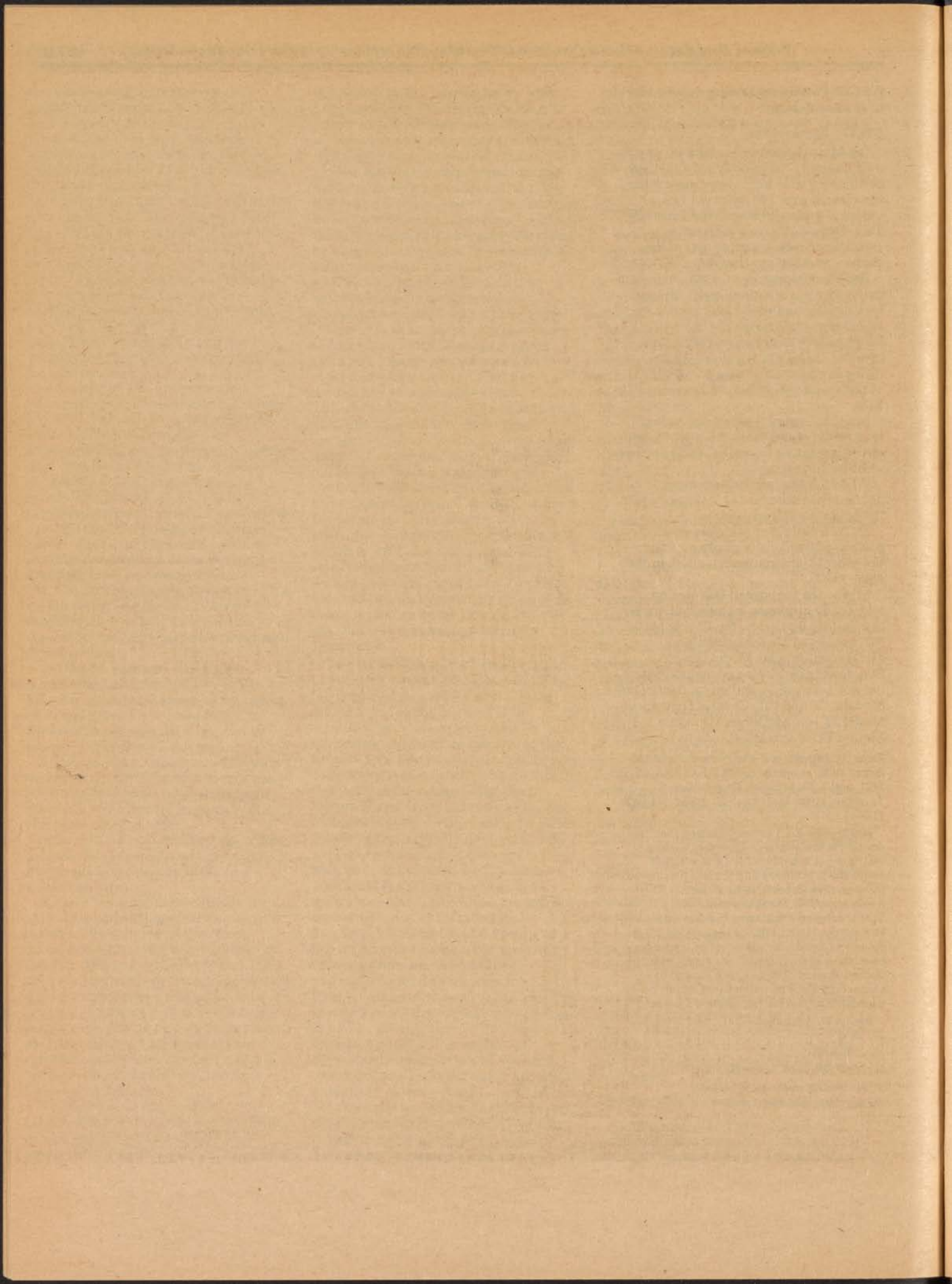
Issued in Washington, D.C., on November 21, 1979.

M. C. Beard,

Director Office of Airworthiness.

[FR Doc. 79-36045 Filed 11-28-79; 8:45 am]

BILLING CODE 4910-13-M



Federal Reserve

Thursday
November 29, 1979

Part VII

Securities and Exchange Commission

Shareholder Communications,
Shareholder Participation in the
Corporate Electoral Process and
Corporate Governance Generally

SECURITIES AND EXCHANGE COMMISSION

17 CFR Part 240

[Release No. 34-16356]

Shareholder Communications, Shareholder Participation in the Corporate Electoral Process and Corporate Governance Generally

AGENCY: Securities and Exchange Commission.

ACTION: Final rules.

SUMMARY: The Commission announces the adoption of rule and schedule amendments which are intended to provide greater opportunities for shareholders to exercise their right of suffrage and to obtain information and advice with respect to matters on which they vote. The amendments require that shareholders be provided with a form of proxy which (a) indicates whether the proxy is solicited on behalf of the issuer's board of directors, (b) permits shareholders to withhold authority to vote for each nominee for election as a director, and (c) provides a means by which shareholders are afforded an opportunity to abstain from matters referred to in the proxy card as to which shareholders have an opportunity to vote, other than elections to office. The Commission also is adopting a rule requiring that shareholders be provided, under certain circumstances, with information concerning the votes cast for and withheld from incumbent directors. Other rule amendments exempt from the informational and filing requirements of the proxy rules the furnishing of proxy voting advice by financial advisors, under certain limited circumstances. Such activities, however, as well as non-issuer solicitations made to ten or fewer persons, are subject to the proxy rule prohibition against false or misleading statements. Additionally, the Commission is adopting a rule which requires disclosure of the date by which shareholder proposals must be received in order to be included in the issuer's proxy statement.

EFFECTIVE DATE: The amendments to Regulation 14A and Schedule 14A are effective for all issuers for filings made on or after December 31, 1979.

FOR FURTHER INFORMATION CONTACT: Amy L. Goodman, (202) 272-2597, G. Michael Stakias, (202) 272-2589 or Gregory H. Mathews, (202) 272-2644, Division of Corporation Finance, Securities and Exchange Commission, Washington, D.C. 20549.

SUPPLEMENTARY INFORMATION: The Securities and Exchange Commission today adopted amendments to Regulation 14A (17 CFR 240.14a-1 et seq.) and Schedule 14A (17 CFR 240.14a-101) under the Securities Exchange Act of 1934 [15 U.S.C. 78a, et seq., as amended by Pub. L. No. 94-29 (June 4, 1975)]. The amendments are part of the Commission's continuing consideration of issues which have been raised in its reexamination of rules relating to shareholder communications, shareholder participation in the corporate electoral process and corporate governance generally.

I. Background

In April 1977, the Commission authorized its staff to institute a broad re-examination of its rules relating to shareholder communications, shareholder participation in the corporate electoral process and corporate governance generally.¹ Public hearings were held in the fall of 1977 on a number of issues, including the adequacy of existing avenues of communications between shareholders and corporations and the role of shareholders in the corporate electoral process.

In light of the complexity and variety of issues under consideration, the Commission determined to proceed in stages. In July 1978, the Commission published for comment rulemaking proposals intended to provide shareholders with information to facilitate their assessment of the structure, composition and functioning of issuers' boards of directors.² The adoption of these proposals for the 1979 proxy season was announced in Securities Exchange Act Release No. 15384 (December 6, 1978), 43 FR 58522 (December 14, 1978). At that time, the Commission indicated that additional stages of its response to the issues raised in the proceeding would consist of possible rulemaking proposals or recommendations for legislation and the publication of a staff report on other important questions under consideration.

On August 13, 1979, the Commission proposed certain amendments to its

proxy rules.³ The proposals were designed, among other things, to provide an opportunity for more meaningful shareholder participation in the corporate electoral and decision-making process. More than 600 individuals and organizations submitted letters in response to the Commission's request for comments. While most of the commentators were sympathetic to the Commission's goals, they raised concerns about the costs and difficulties of implementing the proposed amendments at this time, particularly those amendments which would permit shareholders to vote against individual directors and would eliminate authority of the proxy holder to vote the shares of any shareholder who failed to provide instructions.

Many commentators asserted that since few, if any, shareholders dissent from proposed corporate transactions or otherwise express their dissatisfaction to the company, no change is necessary or desirable—the system seems to be working. The Commission believes, however, that infrequent dissent or the absence of pervasive complaints by shareholders does not necessarily mean that the system of shareholder participation is functioning adequately or could not be improved without imposing excessive costs. In fact, some commentators noted that reduced levels of participation may be attributable to lack of meaningful ways to have one's voice heard.

The Commission's decision in 1977 to undertake a broad examination of its proxy rules relating to shareholder participation included a commitment to consider amending the existing proxy rules in ways that could increase the opportunities for shareholders to participate meaningfully in corporate governance, particularly where the burdens of change would be minimal. The Commission continues to believe that corporate accountability can be significantly enhanced if shareholders are actively involved in selecting directors, whether through the functioning of nominating committees or otherwise. Thus, the Commission believes that the rules it is adopting today are a step toward increasing the necessary shareholder participation, while at the same time not entailing significant costs.

The rules adopted today take into account the principal objections submitted by the commentators. The revisions in the proposals are discussed below.

¹ Securities Exchange Act Release No. 13901 (August 29, 1977), 42 FR 44860 (September 7, 1977), contains a statement of the issues on which testimony and comments were requested. The identification of these issues was based, in part, upon the public comments received in response to the Commission's prior release, Securities Exchange Act Release No. 12482 (April 28, 1977), 42 FR 23901 (May 11, 1977).

² See Securities Exchange Act Release No. 14970 (July 18, 1978), 43 FR 31945 (July 24, 1978).

³ See Securities Exchange Act Release No. 16104 (August 13, 1979), 44 FR 46938 (August 20, 1979).

II. Voting on Individual Nominees for Director—Rule 14a-4(b)(2)

Rule 14a-4(b)(2), as proposed, would have required that a form of proxy relating to the election of directors list the nominees individually. It also would have permitted shareholders to vote for or against each nominee, individually, by marking a box or by other similar means. A mechanism for shareholders to vote in favor of the entire slate of nominees by marking a single box, rather than by marking boxes for each of the nominees, also would have been permitted provided that there was a similar means for the security holder to vote against the entire slate.

In the release announcing publication of the proposal, the Commission expressed the view that "corporations should explore further the possibility that shareholder participation, quantitatively and qualitatively, might increase if the opportunities for such participation were made more meaningful." The Commission also expressed its belief that presently the act of shareholder voting is virtually pro forma and that "shareholders ought to have an opportunity for more meaningful participation in the director selection process." This desire to provide shareholders with a means to vote with respect to individual nominees was tempered, however, by recognition of the fact that the continued use by issuers of data processing techniques to tabulate votes might become difficult and substantially more expensive under the proposed amendments. Accordingly, the Commission specifically requested suggestions for accomplishing the proposed changes in the proxy card in a manner which would permit the continued use of existing tabulating techniques.

Almost all of the comment letters contained an assessment of proposed rule 14a-4(b)(2), and, in fact, a large number dealt only with this issue and that of discretionary voting, pursuant to proposed rule 14a-4(b)(3). Many commentators believed that rulemaking in the area of corporate accountability should focus on strengthening the independent role of the board, as well as the structure of the board and its committee system, rather than unduly politicizing the corporate electoral process through a provision for individual voting. Others commented that when shareholders vote for directors, they are voting for or against the board as a cohesive managing body and have little interest in individual nominees. Conversely, some commentators expressed the opinion that such a requirement was long

overdue and that, in light of the recent amendments to the proxy rules regarding disclosure of certain personal and economic relationships between directors and the issuer or management, it seemed particularly important to allow shareholders the opportunity to express individual preferences. Similarly, there was some expression of support for the principle of individual voting, but disagreement with the proposal in light of the practical problems and costs which would result from implementation.

Virtually all of the commentators addressed themselves to questions concerning the feasibility of structuring a proxy card to allow individual voting and the costs necessary for implementation. The corporate commentators generally expressed opposition to the proposal based on cost estimates included in their comments. Most of these commentators, including corporate transfer agents, asserted that this proposal would make the current vote tabulation system obsolete, thereby requiring new data handling systems in order to tabulate the expanded number of proposals. It was further argued that the proposal would not only reduce the accuracy and efficiency of the tabulation process, but also would overly complicate the process of voting on a proxy card, thereby fostering shareholder disinterest and confusion.

A number of legal commentators questioned the treatment of an "against" vote under state law, most arguing that it normally would have no effect in an election. They also expressed the concern that shareholders might be misled into thinking that their against votes should have an effect when, as a matter of substantive law, such is not the case since such votes are treated simply as abstentions.

The Commission recognized that proposed rule 14a-4(b)(2) might create practical tabulating difficulties as well as increase the basic costs of the proxy solicitation process. As noted above, in an attempt to be sensitive to these problems, the Commission specifically requested information on the estimated additional costs of the rules, as well as information on the practical difficulties which could be encountered. A number of commentators suggested less costly means of permitting shareholders to vote for nominees individually. Some proposed providing a blank space for shareholders to write in the names of those from whom they would like their votes withheld, while others suggested the same result could be accomplished by allowing shareholders to strike the names of those listed nominees from

whom they wished to withhold their votes.

The Commission has carefully considered the comments and recognizes that, given the present state of proxy tabulation procedures, the rule, as proposed, could be burdensome to some companies and that there may be other ways to achieve similar benefits without the economic and practical difficulties presented by the proposed rule. Therefore, as adopted, rule 14a-4(b)(2) has been revised to delete the specific requirement of a for and against vote for individual nominees. Instead, the rule provides that the form of proxy shall clearly provide one of several designated methods for security holders to withhold authority to vote for each nominee. It is contemplated that the rule will allow issuers to provide shareholders the opportunity to express themselves in the most economic and practical manner. The Commission intends to monitor the workings of the rule and will consider appropriate revisions as deemed necessary to facilitate shareholder participation in the corporate electoral process.

Rule 14a-4(b)(2), as revised, requires that the names of the persons nominated to the board shall be set forth on the form of proxy. This requirement will provide shareholders with the readily accessible information upon which to withhold authority from individual nominees if such is their desire. It is contemplated that a horizontal listing of the nominees could be set forth in the space available on the form of proxy.⁴

The form of proxy also may provide for a security holder to grant authority to vote for nominees set forth as a group, provided that there is a similar means to withhold such authority. With respect to a security holder's ability to vote for or against an individual nominee, the Commission acknowledges that an "against" vote may have questionable legal effect and therefore could be confusing and misleading to shareholders. Accordingly, the term "withhold authority" has been substituted in the rule. The Commission notes, however, that certain jurisdictions may give legal effect to votes cast against a nominee. Accordingly, an instruction to rule 14a-4(b)(2) indicates that in such situations issuers should provide a means for or security holders to vote against nominees in lieu of, or in addition to,

⁴ Several companies currently provide their shareholders with such a listing without difficulties in space requirements on their form of proxy.

providing them with a means to withhold authority to vote.⁵

The form of proxy would be required to provide one of the following means for security holders to withhold authority for each nominee:⁶

- (i) a box opposite the name of each nominee which may be marked to indicate that authority to vote for such nominee is withheld;⁷ or
- (ii) an instruction in bold-face type which indicates that the security holder may withhold authority to vote for any nominee by lining through or otherwise striking out the name of any nominee; or
- (iii) designated blank spaces in which the shareholder may enter the names of nominees with respect to whom the shareholder chooses to withhold authority to vote; or
- (iv) any other similar means, provided that clear instructions are furnished indicating how the shareholder may withhold authority to vote for any nominee.⁸

As proposed, rule 14a-4(b)(2) provided that, if security holders have cumulative voting rights, the form of proxy may provide a means for the security holder to grant discretionary authority to have one's shares cumulated and voted for any nominees other than nominees the security holder has voted against. This part of rule 14a-4(b)(2) has been eliminated. As the commentators correctly pointed out, this aspect of the rule was permissive in nature, and issuers presently can provide for such authority on the form of proxy if they desire to do so.

III. Disclosure of Votes Cast For and Against Individual Directors—Proposed Item 6(g)

Proposed item 6(g) of Schedule 14A required disclosure, with respect to those classes of voting stock which participated in the election of directors at the most recent annual meeting, of the percentage of shares present at the meeting and voting in the election of directors. It also would have required disclosure, in tabular format, of the percentage of those shares voting in the election of each nominee which was voted for and against each nominee. An

⁵ Votes cast against a nominee would have legal effect in jurisdictions where such votes are counted in determining whether the nominee has received the requisite number of the votes. See, *Strong v. Fromm Laboratories, Inc.*, 273 Wis. 139, 77 N.W. 2d 389 (1956).

⁶ Sample proxies which illustrate the following methods are attached as exhibits.

⁷ Certain commentators have indicated that they currently employ optical character readers which may be capable of handling this type of voting system.

⁸ For example, certain organizations provide a punch card method for voting in elections for office.

instruction to the proposed item provided that disclosure would be required only if 5% or more of the shares voting were voted against any incumbent director. If, however, one or more incumbent directors received a negative vote of that size, disclosure would be required as to all directors.

A majority of commentators opposed requiring disclosure of this type. Many specifically opposed the imposition of any negative vote threshold for disclosure of votes cast for and against individual directors. Others argued that negative votes bear no relationship to a director's credentials and would provide no guidance as to what qualities are desired by shareholders. A significant number of comments indicated that the basic intent of the proposals—the disclosure of voting results to shareholders—was sound. However, some of these commentators did suggest that the threshold for disclosure be raised significantly.

A considerable number of commentators also argued that disclosing voting results could tend to deter some qualified persons from serving on boards of directors. Some expressed concern that negative votes would be cast not on the basis of a nominee's qualifications as a director, but on his or her ethnic, racial or sexual classification, or perceived political affiliation.

The Commission is aware of the possibility that some shareholders may be motivated by bias or prejudice in electing to withhold authority for certain nominees. It believes, however, that incidences of such voting would be an exception to the rule.⁹ In addition, the Commission is not persuaded that disclosure of the voting results of individual nominees would discourage qualified persons from serving on boards of directors. The Commission has urged companies to closely examine the composition of their boards and does not want to discourage initiatives in this regard. At the same time, however, the Commission is concerned that shareholders have an important role to play in this process. In this regard, it is important that shareholders understand the nominating process and have access to the views of other shareholders concerning those on the board. Moreover, the Commission believes that disclosure of the voting results would be useful to shareholders and facilitate their participation in the director electoral process.

⁹ Issuers are encouraged to provide information to the Commission's staff concerning any such incidents.

Accordingly, item 6(g), as adopted, requires disclosure of the number of shares present at the meeting and voting or withholding authority to vote in the election of directors, as well as disclosure in tabular format of the percentage of total shares cast for and withheld from the vote for or, where applicable, voted against, each nominee.¹⁰ In response to comments concerning "against" votes, item 6(g) reflects the change to "votes withheld" from individual nominees, except where state law gives legal effect to an against vote. The 5% threshold is retained, however, because the Commission believes it represents a significant number of votes which should be disclosed. In instances where an issuer elects less than the entire board of directors annually, disclosure would be required as to all directors where any director received a 5% or greater withhold or negative vote when most recently elected.

While the Commission has determined to adopt item 6(g), it is persuaded that no information need be given in the proxy statement for the next annual meeting if the issuer has previously furnished to its security holders a post-meeting report which includes the information required by instruction 4 to item 6(g). A small, but nonetheless significant, number of issuers have adopted the practice of mailing to shareholders brief descriptions of their annual meetings and the results of the voting with respect to the various matters submitted for shareholder vote. As noted in the proposing release, the Commission favors such reports.

In view of the fact that this item calls for disclosure of information to be generated by newly adopted rule 14a-4(b)(2), compliance with the item will not be required for the initial proxy season which follows the effective date of rule 14a-4(b)(2).

IV. Unsolicited Voting Advice Furnished by Financial Advisors—Rule 14a-2(b)(2)

Proposed rule 14a-2(b)(2) provided that rules 14a-3 through 14a-8 and 14a-10 through 14a-12 would not apply to the furnishing of proxy voting advice by any person (the "advisor") to any other person with whom the advisor had a business relationship. The proposed rule was designed to remove an impediment to the flow of information to shareholders from professional financial advisors who may be especially familiar with the affairs of issuers.

¹⁰ It is contemplated that such information would be included in the table providing nominee information about each prospective director.

The majority of those commenting upon this proposal supported it. Generally, this group of commentators indicated that financial advisors could provide valuable voting information, the availability of which would improve the participation of shareholders in the voting process. Those opposing the proposal were fearful that the Commission might be acting precipitously without full knowledge of the effects of the proposed exemption.

Most of the negative comments focused on possible definitional or interpretative problems. The proposed rule defined an "advisor" as one who "renders financial advice in the ordinary course of his business." The release announcing the proposal indicated that the term "advisor" would normally include financial analysts, investment advisors and broker-dealers. A few commentators believed that this term should be defined more broadly to cover any person who renders financial, business or legal advice in the ordinary course of his or her business.¹¹ Others thought the definition should be narrowed to include only registered investment advisors and registered broker-dealers. The Commission is retaining the definition of advisor as proposed. The definition focuses on persons with financial expertise and who are likely to be particularly familiar with information about corporate affairs which may be pertinent to voting decisions.

A proposed further condition to the availability of the exemption was that the advisor "disclose any significant relationship with the issuer and any material interest in any matter on which advice is given." Several commentators stated that the existence of other relationships also could have an effect upon the value of the advice. Therefore, the final rule requires the advisor to disclose to the recipient of the advice any significant relationship with the issuer or any of its affiliates or with a shareholder proponent of the matter on which advice is given, in addition to disclosing any material interest of the advisor in the matter to which the advice relates.

The release specifically requested comment on whether the proposed exemption should be available in election contest situations. Most commentators who addressed this issue believed that voting advice could be particularly helpful in the context of an

election contest. However, to clarify that the advisor cannot furnish advice on behalf of any interested party in an election contest, the rule states that the exemption will not be available for proxy voting advice furnished on behalf of any person soliciting proxies or on behalf of a participant in an election contest subject to the provisions of rule 14a-11.

V. Voting of Unmarked Proxies—Rule 14a-4(b)(3)

Rule 14a-4(b)(3), as proposed, would have prohibited a form of proxy from conferring discretionary authority to vote with respect to any matter as to which the security holder is afforded an opportunity to specify a choice and no specification has been made. The proposed rule, however, permitted a form of proxy to provide a means, by ballot, for security holders to grant to the proxy holder discretionary authority to vote for any matter, other than elections to office, as to which the security holder has been afforded an opportunity to specify a choice.

In the release announcing the proposed amendments, the Commission expressed concern that shareholders may choose to abstain on matters by not marking certain of the boxes provided, yet under the present proxy rules such unmarked proxies will be voted in favor of management's positions. The Commission observed that "such a result may not be consistent with the intent of shareholders and could dilute the meaning of the vote conveyed to the issuer's board of directors."

The vast majority of the over 400 commentators that addressed proposed rule 14a-4(b)(3) opposed it. Many of these commentators believed that shareholders currently have adequate opportunities to abstain from voting. Several corporations commented that any shareholder who wishes to abstain on all matters can do so simply by not returning a proxy to the issuer. In addition, it was reported that proxies with "abstain" written beside an item or with a line drawn through the item typically are treated as an abstention when tabulating the votes cast for or against that item. On the other hand, a few commentators asserted that a security holder who wishes to participate in the electoral process should be expected to vote on every matter put to a vote of security holders.

Most commentators who opposed the proposed rule asserted that a significant number of proxies are returned each year signed but unmarked and believed that there is little reason to doubt that shareholders intend an unmarked proxy to be voted for management's

positions.¹² These commentators, noting that shareholders are advised as to how unmarked proxies will be voted, stated that the acts of signing, dating and returning a proxy signified that the executing shareholder desired management to have full voting authority over the shares represented by the proxy. Others had different interpretations of the meaning of a signed, but unmarked proxy. One shareholder contended that an unmarked proxy evidenced a desire to have the security holder's vote counted only for purposes of achieving a quorum at the meeting of security holders. Shareholder intentions are unclear, according to another commentator, because some companies "attempt to make return of a signed and dated proxy card as automatic and unthinking a process as possible."

Commentators foresaw numerous problems if the rule were adopted as proposed. Chief among their concerns was the fear that shareholders would continue to return unmarked proxies intending to grant voting authority to the proxy. In the opinion of many commentators, extensive re-education efforts would be needed to alter this traditional mode of shareholder response. Others argued that if unmarked proxies could not be voted on the matters to be considered at the meeting, it could become extremely difficult to attain the specified level of votes required for approval of certain measures deemed critical to the orderly functioning of issuers. A few corporations also were concerned that disregarding unmarked proxies would tend to increase artificially the percentage of votes cast in favor of shareholder proposals, which might result in adoption of special interest proposals not supported by security holders on the whole.

The Commission is sensitive to the possibility that adoption of the rule, as proposed, could impede attainment of a specified percentage of votes needed to adopt measures important to issuers' operations. The Commission is concerned, however, that there be adequate opportunities for security holders to use the proxy form to clearly convey their voting instructions to the issuer. Therefore, rule 14a-4(b)(1) has been revised to require that the form of proxy provide a means for the person solicited to specify, by boxes, a choice to abstain with respect to each matter to be acted upon, as well as to approve or disapprove each matter, other than

¹² Based upon the comment letters, it appears that between 20-50% of the proxies returned to issuers are signed but otherwise unmarked.

¹¹ It should be noted that, under ordinary circumstances, the requirements of the present proxy rules will not apply to the relationship between a client and his attorney or accountant. The proxy rules regulate the conduct only of those who participate in the solicitation of proxies.

elections to office. To help minimize the number of abstentions when significant proposals recommended by the board of directors are voted upon and to clarify the meaning of signed but unmarked proxies, the Commission requests issuers to make greater efforts to encourage security holders to vote on the matters to be considered at the meeting.¹³

Rule 14a-4(b)(1), as amended, will continue to permit a proxy to confer discretionary authority with respect to matters as to which a choice is not specified, provided that the form of proxy states in bold-face type how it will be voted as to each matter. Rule 14a-4(b)(2), as amended, provides that such authority also exists with respect to the election of directors.

VI. Identification of Persons on Whose Behalf Proxies are Solicited—Rule 14a-4(a)

Proposed rule 14a-4(a) would require that the proxy card, if provided by the issuer, indicate in bold-face type whether or not the proxy is solicited on behalf of the issuer's board of directors. If the proxy card is provided other than by a majority of the board of directors, the card would identify in bold-face type the person on whose behalf the proxy is solicited.

Commentators who opposed the proposal indicated that, in their view, the distinction between management and the board of directors was not significant. Some asserted that a distinction between management and the board is contrary to state law, because, under most state laws, the business and affairs of the corporation are either managed by the board of directors or under the direction of the board of directors. Other commentators were concerned that changing "management" to "board of directors" might produce legal consequences and implications that have not been sufficiently considered. In addition, a number of commentators were concerned that dropping the label of "management's proxy" would create confusion because it was well understood by shareholders.

A number of commentators, however, supported this proposal. These commentators asserted that the proposal would strengthen corporate accountability because the board of directors and not management has the

responsibility to nominate directors, and the board of directors is legally responsible for the contents of the proxy statement.

The Commission notes that commentators did not specifically identify any undesirable legal consequences or complications from adopting the rule as proposed. Further, the Commission believes that this change will reduce the possibility of confusion by clarifying the persons on whose behalf the proxy is solicited. The Commission agrees with those commentators who suggested that this proposal will strengthen corporate accountability. Accordingly, the final rule requires identification of the persons on whose behalf the proxy is solicited, whether it is the board of directors or persons opposing the issuer's solicitation. Certain commentators were concerned with references in other parts of the proxy rules to "management's proxy materials." The Commission concurrently is adopting technical amendments to its rules to delete or modify such references as is appropriate.¹⁴

VII. Limiting the Exemption From the Proxy Rules for Certain Nonissuer Solicitations—Rule 14a-2(b)(4)

Proposed rule 14a-2(b)(1) would subject non-issuer solicitations made to ten or fewer persons to rule 14a-9. This proposal was the subject of little commentary. The Commission believes that the application of rule 14a-9 to all solicitations is a necessary means of assuring that communications which may influence shareholder voting decisions are not materially false or misleading. Accordingly, the rule as adopted extends the prohibitions of rule 14a-9 to non-issuer solicitations made to ten or fewer persons.

VIII. Disclosure of the Date for Receipt of Shareholder Proposals—Rule 14a-5(f)

Proposed rule 14a-5(f) would require an issuer's proxy statement to disclose, under an appropriate caption, the date by which shareholder proposals must be received by the issuer for inclusion in the proxy materials relating to the next annual meeting. This date would be calculated according to the provisions of rule 14a-8(a)(3)(i). The proposed rule further provides that, if the date of the next annual meeting is subsequently advanced by more than 30 calendar days or delayed by more than 90 calendar days from the date of the annual meeting to which the proxy

statement relates, the issuer shall promptly inform shareholders of the change by any means reasonably calculated to so inform them.

Some commentators were concerned that the rule would facilitate the flow of frivolous and spurious shareholder proposals which have little shareholder support. In addition, a number of commentators were concerned with the provision in the rule requiring notice to shareholders if the next annual meeting is advanced by more than 30 calendar days or delayed by more than 90 calendar days. These commentators suggested that a separate mailing would be costly and that routine or regular reports to shareholders would provide a reasonable alternative provided that these alternative mailings would reach shareholders in a reasonable time for a "shareholder proposal" to be submitted under the revised schedule.

Other commentators were concerned that (1) notice far in advance of the deadline may be quickly forgotten, (2) disclosing the change in the meeting date would elevate the cut-off date for shareholder submissions to an unrealistic level of importance, (3) issuers' time to analyze and respond to shareholder proposals would be diminished; therefore, the deadline should be expanded to 120 days to allow adequate time for issuer analysis and response, and (4) shareholders seriously interested in a proposal are sufficiently familiar with the proxy rules to learn the requirements of rule 14a-8 and submit such proposals on a timely basis without disclosure in the proxy statement.

The staff's experience in rendering informal advisory assistance with respect to the operation of the shareholder proposal rule indicates that many shareholder proponents fail to meet the burden of submitting proposals on a timely basis. By requiring disclosure of the deadline for submission of proposals, the final rule may increase the certainty of meeting the filing requirements under rule 14a-8 and minimize inadvertent timing errors in the submission of proposals. In the Commission's view, this rule will help eliminate confusion and misunderstanding, thereby enhancing the opportunity for shareholders to participate in the corporate governance process.

The Commission is persuaded that the concerns expressed with regard to costly separate mailings are valid. Accordingly, the Commission has changed the requirement that "the issuer shall promptly inform security holders" to "the issuer shall, in a timely manner, inform security holders." Therefore, routine or regular mailings may be used

¹³ Based on the staff's examination of a sample of proxy statements filed with the Commission during 1979, it appears that, at present, most issuers request security holders to "sign, date and return" proxies, but do not ask them to "vote" or to otherwise indicate their choices with respect to the matters to be voted upon.

¹⁴ See Securities Exchange Act Release No. 16357 (November 21, 1979).

to inform shareholders of changes in the meeting date and the new deadline for submission of "shareholder proposals." However, shareholders must have a reasonable time after receipt of these alternative mailings to submit a "shareholder proposal."

Technical amendments have been made in rule 14a-8(a)(3)(i) in order to conform it to the revisions made by these amendments.

IX. Disclosure of Cumulative Voting Rights—Item 5(c)

Proposed item 5(c) of schedule 14A would add to the present provisions a requirement that cumulative voting rights be briefly described and also require disclosure of the effect on the election of directors of casting votes against nominees. Further, if discretionary authority to cumulate votes is solicited pursuant to the provisions of proposed rule 14-4(b)(2), the proxy statement would be required to indicate whether votes will be cast for any nominee or nominees in preference to others and, if so, in what manner.

The Commission believes that a brief description of cumulative voting rights will provide useful information to shareholders and will facilitate and promote informed voting decisions in the corporate electoral process. Accordingly, the requirement that cumulative voting rights be described has been retained.

Many commentators were opposed to disclosing the effect on the election of directors of casting votes against nominees. These commentators asserted that the proposal was confusing because state law either does not extend a right to vote against directors or does not recognize a vote cast against directors. Other commentators were concerned that the proposal would raise unwarranted expectations as to the significance of votes cast against directors. A small number of commentators asserted that this requirement would lend itself to self-serving, boiler-plate statements. The Commission agrees with these arguments and, accordingly, has deleted the requirement that the effect on the election of directors of casting votes against nominees be disclosed.

Many commentators opposed the requirement that the proxy statement indicate whether votes will be cast for any nominees in preference to others and, if so, the manner of casting these votes, if discretionary authority to cumulate votes was solicited. These commentators were concerned that requiring an advance determination of exactly how shares will be cumulatively

voted would unduly restrict management's effectiveness and its ability to act at the meeting. Further, they stated this would not be in keeping with the express authority granted to management by shareholders. Some commentators also expressed concern that predetermining how shares will be cumulated would be needlessly divisive and of questionable relevance. Others believed that requiring a prior commitment to vote discretionary proxies in a particular order of preference might make it impossible to cumulate votes in the most efficient manner. Several commentators suggested that management's discretionary authority to cumulate votes for a nominee or nominees in preference to others could be a violation of state law.

The Commission recognizes that this requirement may present numerous problems. Accordingly, the revision of this proposed rule reflects elimination of the requirement that, where discretionary authority to cumulate votes is solicited, any preference among nominees be disclosed. The revised rule simply requires that, if discretionary authority to cumulate votes is solicited, that fact should be indicated. The Commission notes that, if an issuer should desire to disclose preferences among nominees, such disclosure may be voluntarily undertaken.

X. Certain Findings

As required by section 23(a)(2) of the Exchange Act, the Commission has specifically considered the impact which the amendments adopted herein would have on competition and has concluded that they impose no significant burden on competition. In any event, the Commission has determined that any possible burden will be outweighed by, and is necessary and appropriate to achieve, the benefits of these amendments to investors and registrants.

Text of Amendments

PART 240—GENERAL RULES AND REGULATIONS, SECURITIES EXCHANGE ACT OF 1934

17 CFR Part 240 is amended as follows:

1. § 240.14a-2 is revised to read as follows:

§ 240.14a-2 Solicitations to which § 240.14a-3 to § 240.14a-12 apply.

Sections 240.14a-3 to 240.14a-12 apply to every solicitation of a proxy with respect to securities registered pursuant to section 12 of the Act, whether or not

trading in such securities has been suspended, except that:

(a) Sections 240.14a-3 to 240.14a-12 do not apply to the following:

(1) Any solicitation by a person in respect to securities carried in his name or in the name of his nominee (otherwise than as voting trustee) or held in his custody, if such person—

(i) Receives no commission or remuneration for such solicitation, directly or indirectly, other than reimbursement of reasonable expenses,

(ii) Furnishes promptly to the person solicited a copy of all soliciting material with respect to the same subject matter or meeting received from all persons who shall furnish copies thereof for such purpose and who shall, if requested, defray the reasonable expenses to be incurred in forwarding such material, and

(iii) In addition, does no more than impartially instruct the person solicited to forward a proxy to the person, if any, to whom the person solicited desires to give a proxy, or impartially request from the person solicited instructions as to the authority to be conferred by the proxy and state that a proxy will be given if no instructions are received by a certain date.

(2) Any solicitation by a person in respect of securities of which he is the beneficial owner;

(3) Any solicitation involved in the offer and sale of securities registered under the Securities Act of 1933: *Provided*, That this paragraph shall not apply to securities to be issued in any transaction of the character specified in paragraph (a) of Rule 145 under that Act;

(4) Any solicitation with respect to a plan of reorganization under Chapter X of the Bankruptcy Act, as amended, if made after the entry of an order approving such plan pursuant to section 174 of said Act and after, or concurrently with, the transmittal of information concerning such plan as required by section 175 of said Act;

(5) Any solicitation which is subject to Rule 62 under the Public Utility Holding Company Act of 1935; and

(6) Any solicitation through the medium of a newspaper advertisement which informs security holders of a source from which they may obtain copies of a proxy statement, form of proxy and any other soliciting material and does no more than (i) name the issuer, (ii) state the reason for the advertisement, and (iii) identify the proposal or proposals to be acted upon by security holders.

(b) Sections 240.14a-3 to 240.14a-8 and 240.14a-10 to 240.14a-12 do not apply to the following:

(1) Any solicitation made otherwise than on behalf of the issuer where the total number of persons solicited is not more than ten; and

(2) The furnishing of proxy voting advice by any person (the "advisor") to any other person with whom the advisor has a business relationship, if:

(i) The advisor renders financial advice in the ordinary course of his business;

(ii) The advisor discloses to the recipient of the advice any significant relationship with the issuer or any of its affiliates, or a shareholder proponent of the matter on which advice is given, as well as any material interest of the advisor in such matter;

(iii) The advisor receives no special commission or remuneration for furnishing the proxy voting advice from any person other than a recipient of the advice and other persons who receive similar advice under this subsection; and

(iv) The proxy voting advice is not furnished on behalf of any person soliciting proxies or on behalf of a participant in an election subject to the provisions of Rule 14a-11.

II. Paragraphs (a) and (b) of § 240.14a-4 are amended to read as follows:

§ 240.14a-4 Requirements as to proxy.

(a) The form of proxy (1) shall indicate in bold-face type whether or not the proxy is solicited on behalf of the issuer's board of directors or, if provided other than by a majority of the board of directors, shall indicate in bold-face type the identity of the persons on whose behalf the solicitation is made; (2) shall provide a specifically designated blank space for dating the proxy card; and (3) shall identify clearly and impartially each matter or group of related matters intended to be acted upon, whether proposed by the issuer or by security holders. No reference need be made, however, to proposals as to which discretionary authority is conferred pursuant to paragraph (c) of this section.

(b)(1) Means shall be provided in the form of proxy whereby the person solicited is afforded an opportunity to specify by boxes a choice between approval or disapproval of, or abstention with respect to, each matter or group of related matters referred to therein as intended to be acted upon, other than elections to office. A proxy may confer discretionary authority with respect to matters as to which a choice is not specified by the security holder provided that the form of proxy states in bold-face type how it is intended to vote the shares represented by the proxy in each such case.

(2) A form of proxy which provides for the election of directors shall set forth the names of persons nominated for election as directors. Such form of proxy shall clearly provide any of the following means for security holders to withhold authority to vote for each nominee:

(i) A box opposite the name of each nominee which may be marked to indicate that authority to vote for such nominee is withheld; or

(ii) An instruction in bold-face type which indicates that the security holder may withhold authority to vote for any nominee by lining through or otherwise striking out the name of any nominee; or

(iii) Designated blank spaces in which the shareholder may enter the names of nominees with respect to whom the shareholder chooses to withhold authority to vote; or

(iv) Any other similar means, provided that clear instructions are furnished indicating how the shareholder may withhold authority to vote for any nominee.

Such form of proxy also may provide a means for the security holder to grant authority to vote for the nominees set forth, as a group, provided that there is a similar means for the security holder to withhold authority to vote for such group of nominees. Any such form of proxy which is executed by the security holder in such manner as not to withhold authority to vote for the election of any nominee shall be deemed to grant such authority, provided that the form of proxy so states in bold-face type.

Instructions. 1. Paragraph (2) does not apply in the case of a merger, consolidation or other plan if the election of directors is an integral part of the plan.

2. If applicable state law gives legal effect to votes cast against a nominee, then in lieu of, or in addition to, providing a means for security holders to withhold authority to vote, the issuer should provide a similar means for security holders to vote against each nominee.

III. Section 240.14a-5 is amended by adding paragraph (f) to read as follows:

§ 240.14a-5 Presentation of information in proxy statement.

(f) All proxy statements shall disclose, under an appropriate caption, the date by which proposals of security holders intended to be presented at the next annual meeting must be received by the issuer for inclusion in the issuer's proxy statement and form of proxy relating to that meeting, such date to be calculated in accordance with the provisions of rule 14a-8(a)(3)(i). If the date of the next

annual meeting is subsequently advanced by more than 30 calendar days or delayed by more than 90 calendar days from the date of the annual meeting to which the proxy statement relates, the issuer shall, in a timely manner, inform security holders of such change, and the date by which proposals of security holders must be received, by any means reasonably calculated to so inform them.

IV. Paragraph (a)(3)(i) of § 240.14a-8 is amended to read as follows:

§ 240.14a-8 Proposals of security holders.

(a) * * *

(3) * * *

(i) *Annual Meetings.* A proposal to be presented at an annual meeting shall be received at the issuer's principal executive offices not less than 90 days in advance of the date of the issuer's proxy statement released to security holders in connection with the previous year's annual meeting of security holders, except that if no annual meeting was held in the previous year or the date of the annual meeting has been changed by more than 30 calendar days from the date contemplated at the time of the previous year's proxy statement, a proposal shall be received by the issuer a reasonable time before the solicitation is made.

V. Item 5(c) of § 240.14a-101 is amended and paragraph (g) added to Item 6 thereof to read as follows:

§ 240.14a-101 Schedule 14A. Information required in proxy statement.

Item 5. Voting Securities and Principal Holders Thereof

(c) If action is to be taken with respect to the election of directors and if the persons solicited have cumulative voting rights: (1) Make a statement that they have such rights, (2) briefly describe such rights, (3) state briefly the conditions precedent to the exercise thereof, and (4) if discretionary authority to cumulate votes is solicited, so indicate.

Item 6. Directors and Executive Officers

(g) With respect to those classes of voting stock which participated in the election of directors at the most recent meeting at which directors were elected:

(1) State in an introductory paragraph the percentage of shares present at the meeting and voting or withholding authority to vote in the election of directors; and (2) disclose in tabular format, following such introductory paragraph, the percentage of total shares cast for and withheld from the vote for or, where applicable, cast against, each nominee,

which, respectively, were voted for and withheld from the vote for, or voted against, such nominee. When groups of classes or series of classes voted together in the election of a director or directors, they shall be treated as a single class for the purpose of the preceding sentence.

Instructions. 1. Calculate the percentage of shares present at the meeting and voting or withholding authority to vote in the election of directors, referred to in paragraph g(1), by dividing the total shares cast for and withheld from the vote for or, where applicable, voted against, the director in respect of whom the highest aggregate number of shares was cast by the total number of shares outstanding which were eligible to vote as of the record date for the meeting.

2. No information need be given in response to item 6(g) unless, with respect to any class of voting stock (or group of classes which voted together), 5% or more of the total shares cast for and withheld from the vote for or, where applicable, cast against any nominee were withheld from the vote for or cast against such nominee.

3. If an issuer elects less than the entire board of directors annually, disclosure is required as to all directors if 5% or more of the total shares cast for and withheld from, the vote for, or, where applicable, cast against any incumbent director were withheld from, or cast against the vote for such director at the meeting at which he was most recently elected.

4. No information need be given in response to item 6(g) if the issuer has previously furnished to its security holders a report of the results of the most recent meeting of security holders at which directors were elected which includes: (1) a description of each matter voted upon at the meeting and a statement of the percentage of the shares voting which were voted for and against each such matter; and (2) the information which would be called for by this item 6(g). If an issuer has previously furnished such results to its security holders, this fact should be set forth in the issuer's cover letter accompanying the filing of preliminary proxy materials with the Commission.

[Secs. 12, 13, 14, 15(d), 23(a), 48 Stat. 892, 894, 895, 901; secs. 1, 3, 8, 49 Stat. 1375, 1377, 1379; sec. 203(a), 49 Stat. 704; sec. 202, 68 Stat. 686; secs. 3, 4, 5, 6, 78, Stat. 565-568, 569, 570-574; secs. 1, 2, 3, 82 Stat. 454, 455, secs. 28(c), 1, 2, 3-5, 84 Stat. 1435, 1497; secs. 10, 18, 89 Stat. 119, 155; sec. 308(b), 90 Stat. 57; sec. 204, 91 Stat. 1500; 15 U.S.C. 781, 78m, 78n, 78o(d), 78w(a)]

The Commission finds that any changes in the amended rules and schedule adopted from those published in Securities Exchange Act Release No. 16104 have already been generally subject to comment and are either

technical in nature or less burdensome than previous requirements so that further notice and rulemaking procedures pursuant to the Administrative Procedure Act (5 U.S.C. 553) are not necessary.

By the Commission.

Shirley E. Hollis,
Assistant Secretary.

November 21, 1979.

BILLING CODE 8010-01-M

EXHIBIT

UB UNIVERSAL
BUSINESS
CORPORATION

270 Universal Center, Horizon, California 91770

Proxy

This Proxy is Solicited on Behalf of the Board of Directors.

The undersigned hereby appoints John Red, Mary Blue, and Lee White as Proxies, each with the power to appoint his or her substitute, and hereby authorizes them to represent and to vote, as designated below, all the shares of common stock of Universal Business held on record by the undersigned on October 23, 1980, at the annual meeting of shareholders to be held on December 20, 1980 or any adjournment thereof.

1. ELECTION OF DIRECTORS FOR all nominees listed below ☐ WITHHOLD AUTHORITY ☐
(except as marked to the contrary below) to vote for all nominees listed below

(INSTRUCTION: To withhold authority to vote for any individual nominee strike a line through the nominee's name in the list below.)

J. Allen, S. Brown, J. Doe, J. Green, G. Johansen, A. Jones, M. Roe, J. Smith and M. Stanton

2. PROPOSAL TO APPROVE THE APPOINTMENT OF DOLLAR AND CENTS as the independent public accountants of the corporation

☐ FOR ☐ AGAINST ☐ ABSTAIN

3. STOCKHOLDER PROPOSAL RELATING TO FORM AND CONTENT OF POST-MEETING REPORTS:

☐ FOR ☐ AGAINST ☐ ABSTAIN

4. In their discretion, the Proxies are authorized to vote upon such other business as may properly come before the meeting.

This proxy when properly executed will be voted in the manner directed herein by the undersigned stockholder.
If no direction is made, this proxy will be voted for Proposals 1, 2 and 3.

Please sign exactly as name appears below. When shares are held by joint tenants, both should sign. When signing

as attorney, as executor, administrator, trustee or guardian, please give full title as such. If a corporation, please sign in full corporate name by President or other authorized officer. If a partnership, please sign in partnership name by authorized person.

SAMPLE CARD A

DATED _____, 1980

PLEASE MARK, SIGN, DATE AND RETURN THE PROXY
CARD PROMPTLY USING THE ENCLOSED ENVELOPE

Signature _____

Signature if held jointly _____

EXHIBIT

UB UNIVERSAL
BUSINESS
CORPORATION

270 Universal Center, Horizon, California 91770

Proxy

This Proxy is Solicited on Behalf of the Board of Directors,

The undersigned hereby appoints John Red, Mary Blue, and Lee White as Proxies, each with the power to appoint his or her substitute, and hereby authorizes them to represent and to vote, as designated below, all the shares of common stock of Universal Business held on record by the undersigned on October 23, 1980, at the annual meeting of shareholders to be held on December 20, 1980 or any adjournment thereof.

1. ELECTION OF DIRECTORS FOR all nominees listed below ☐ WITHHOLD AUTHORITY
(except as marked to the contrary below) to vote for all nominees listed below ☐

J. Allen, S. Brown, J. Doe, J. Green, G. Johansen, A. Jones, M. Roe, J. Smith and M. Stanton

(INSTRUCTION: To withhold authority to vote for any individual nominee write that nominee's name on the space provided below.)

2. PROPOSAL TO APPROVE THE APPOINTMENT OF DOLLAR AND CENTS as the independent public accountants of the corporation
☐ FOR ☐ AGAINST ☐ ABSTAIN
3. STOCKHOLDER PROPOSAL RELATING TO FORM AND CONTENT OF POST-MEETING REPORTS:
☐ FOR ☐ AGAINST ☐ ABSTAIN

4. In their discretion, the Proxies are authorized to vote upon such other business as may properly come before the meeting.

This proxy when properly executed will be voted in the manner directed herein by the undersigned stockholder. If no direction is made, this proxy will be voted for Proposals 1, 2 and 3.

Please sign exactly as name appears below. When shares are held by joint tenants, both should sign. When signing as attorney, as executor, administrator, trustee or guardian, please give full title as such. If a corporation, please sign in full corporate name by President or other authorized officer. If a partnership, please sign in partnership name by authorized person.

SAMPLE CARD B

DATED _____, 1980

PLEASE MARK, SIGN, DATE AND RETURN THE PROXY
CARD PROMPTLY USING THE ENCLOSED ENVELOPE

Signature _____

Signature if held jointly _____

EXHIBIT

UB UNIVERSAL
BUSINESS
CORPORATION

Proxy

270 Universal Center, Horizon, California 91770

This Proxy is Solicited on Behalf of the Board of Directors,

The undersigned hereby appoints John Red, Mary Blue, and Lee White as Proxies, each with the power to appoint his or her substitute, and hereby authorizes them to represent and to vote, as designated below, all the shares of common stock of Universal Business held on record by the undersigned on October 23, 1980, at the annual meeting of shareholders to be held on December 20, 1980 or any adjournment thereof.

1. ELECTION OF DIRECTORS FOR all nominees listed below ☐ WITHHOLD AUTHORITY
(except as marked to the contrary below) to vote for all nominees listed below ☐

(INSTRUCTION To withhold authority to vote for any individual nominee mark the box next to the nominee's name below.)

☐ J. Allen ☐ S. Brown ☐ J. Doe ☐ J. Green ☐ G. Johansen ☐ A. Jones ☐ M. Roe ☐ J. Smith ☐ M. Stanton

2. PROPOSAL TO APPROVE THE APPOINTMENT OF DOLLAR AND CENTS as the independent public accountants of the corporation

☐ FOR ☐ AGAINST ☐ ABSTAIN

3. STOCKHOLDER PROPOSAL RELATING TO FORM AND CONTENT OF POST-MEETING REPORTS:

☐ FOR ☐ AGAINST ☐ ABSTAIN

4. In their discretion, the Proxies are authorized to vote upon such other business as may properly come before the meeting.

This proxy when properly executed will be voted in the manner directed herein by the undersigned stockholder. If no direction is made, this proxy will be voted for Proposals 1, 2 and 3.

Please sign exactly as name appears below. When shares are held by joint tenants, both should sign. When signing as attorney, as executor, administrator, trustee or guardian, please give full title as such. If a corporation, please sign in full corporate name by President or other authorized officer. If a partnership, please sign in partnership name by authorized person.

SAMPLE CARD C

DATED: _____, 1980

PLEASE MARK, SIGN, DATE AND RETURN THE PROXY CARD PROMPTLY USING THE ENCLOSED ENVELOPE

Signature _____

Signature if held jointly _____

Environmental Protection Agency

Thursday
November 29, 1979

Part VIII

Environmental Protection Agency

Assessing The Environmental Effects of
EPA Actions Abroad

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 6

[FRL 1337-2]

Assessing the Environmental Effects of EPA Actions Abroad

AGENCY: Environmental Protection Agency.

ACTION: Proposed Regulation.

SUMMARY: On January 4, 1979, President Carter signed Executive Order 12114 pertaining to the "Environmental Effects Abroad of Major Federal Actions." This Executive Order required Federal agencies to develop implementing procedures. This amendment to the EPA implementing procedures on the National Environmental Policy Act under 40 CFR Part 6 sets forth general policy, criteria, and requirements to be carried out within this Agency.

DATE: Written comments will be received with respect to this proposal. Comments must be received on or before January 14, 1980. Upon receipt and analysis of comments, EPA will publish a final rule.

ADDRESS: The mailing address for all comments is the Office of Environmental Review (A-104), Environmental Protection Agency, 401 M Street SW, Washington, D.C. 20460; Attention: Thomas Sheckells.

FOR FURTHER INFORMATION CONTACT: Thomas Sheckells, Office of Environmental Review, Environmental Protection Agency, 401 M Street SW, Washington, D.C. 20460; Telephone 202-755-0790.

SUPPLEMENTARY INFORMATION: Executive Order 12114 requires Federal agencies to assess the environmental effects of major actions they undertake abroad. This includes the possibility of preparing environmental impact statements for significant actions undertaken in the global commons as well as environmental reviews of significant activities undertaken in the global commons and foreign nations as required by these procedures. This proposal adds a new Subpart J under 40 CFR Part 6.

Dated: November 20, 1979.

Douglas M. Costle,
Administrator.

Subpart J—Assessing the Environmental Effects of EPA Actions Abroad

Sec.

- 6.1001 Purpose and policy.
- 6.1002 Applicability.

Sec.

- 6.1003 Environmental review and assessment requirements.
- 6.1004 Special notice to Foreign Nations.
- 6.1005 Lead or Cooperating Agency.
- 6.1006 Exemptions.
- 6.1007 Implementation.

Subpart J—Assessing the Environmental Effects of EPA Actions Abroad

§ 6.1001 Purpose and policy.

(a) *Purpose.* On January 4, 1979, the President signed Executive Order 12114 relating to "Environmental Effects Abroad of Major Federal Actions." The purpose of this Executive Order is to enable responsible Federal officials in carrying out or approving Federal actions abroad to be informed of pertinent environmental considerations and to consider fully the environmental impacts of the actions undertaken. The Order furthers the purpose of the National Environmental Policy Act and the Marine Protection, Research and Sanctuaries Act. The procedures set forth below reflect EPA's duties and responsibilities as required under the Executive Order and satisfy the requirement for issuance of procedures under section 2-1 of the Executive Order.

(b) *Policy.* It shall be the policy of this Agency to carry out the purpose and requirements of the Executive Order to the fullest extent possible. EPA, within the realm of its expertise, shall work with the Department of State and the Council on Environmental Quality to provide information to other Federal agencies and foreign nations to heighten awareness of and interest in the environment. EPA shall further cooperate to the extent possible with Federal agencies to lend special expertise and assistance in the preparation of required environmental documents under the Executive Order. EPA shall perform environmental reviews of activities undertaken in the global commons and foreign nations as required under Executive Order 12114 and as set forth under these procedures.

§ 6.1002 Applicability.

(a) *Administrative actions requiring environmental review.* The environmental review requirements apply to the activities of EPA as set forth below:

(1) Research or demonstration projects undertaken in foreign nations or in the global commons which significantly affect the related environment.

(2) Ocean dumping activities carried out under section 102 of the Marine Protection, Research and Sanctuaries

Act of 1972 (MPRSA) which significantly affect the related environment.

(3) Permitting or licensing by EPA of facilities which will significantly affect the environment of a foreign nation contiguous to the United States. This may include such actions as the issuance by EPA of hazardous waste treatment, storage, or disposal facility permits pursuant to section 3005 of the Resource Conservation and Recovery Act, NPDES permits pursuant to section 402 of the Clean Water Act, or prevention of significant deterioration approvals pursuant to Part C of the clean Air Act.

§ 6.1003 Environmental review and assessment requirements.

(a) *Research and demonstration projects.* The appropriate Assistant Administrator is responsible for performing the necessary degree of environmental review on research and demonstration projects undertaken by EPA. If the research or demonstration project is undertaken in the global commons, an environmental assessment shall be prepared to assist the responsible official in determining whether an EIS is necessary. If it is determined that the action significantly affects the environment of the global commons an EIS shall be prepared. If the undertaking is located in a place other than the global commons and significantly affects a foreign nation or nations, a bilateral or multilateral environmental study shall be prepared by EPA. EPA shall afford the affected foreign nation or international body or organization an opportunity to participate in this study. This environmental study shall result in a concise environmental document setting forth a discussion of the need for the action, an environmental impact analysis of the various alternatives considered and a listing of the agencies consulted. To the extent applicable, the Assistant Administrator shall utilize the criteria set forth under 40 CFR 6.506(a) (1) through (6) and (b) in determining what is a significant effect.

(b) *Ocean dumping activities.* The Assistant Administrator for Water and Waste Management is responsible for preparing appropriate environmental documents relating to ocean dumping activities in the global commons under section 102 of the MPRSA. For ocean dumping site designations prescribed pursuant to section 102(c) of the MPRSA and 40 CFR Part 228, an environmental impact statement shall be prepared consistent with the requirements of EPA's Procedures for the Voluntary Preparation of Environmental Impact Statements dated October 21, 1974 (see

39 FR 37419). Also an environmental impact statement shall be prepared for the establishment or revision of criteria under section 12(a) of MPRSA. For individual permits issued by EPA under section 102(b), an environmental assessment shall be prepared. The permit applicant shall submit with the application an environmental assessment which includes a discussion of the need for the action, an outline of alternatives, and an analysis of the environmental impact of the proposed action and alternatives consistent with the EPA criteria established under section 102(a) of MPRSA. The information submitted by applicants under 40 CFR Part 221 shall be sufficient to satisfy the environmental assessment requirement.

(c) *EPA permitting and licensing activities.* The appropriate Regional Administrator is responsible for conducting concise environmental reviews with regard to hazardous waste permitting, water permitting, and prevention of significant deterioration (PSD) approvals for such actions undertaken by EPA which affect contiguous foreign nations. The information submitted by applicants for such permits or approvals under the applicable consolidated permit and PSD regulations shall be sufficient to satisfy the background information requirements for conducting these concise reviews. This concise review shall focus on assuring the applicant's proposed action complies with existing criteria established under applicable program regulations.

(d) *Review by other Federal agencies and other appropriate officials.* The responsible officials shall consult with other Federal agencies with relevant expertise during the preparation of the environmental document. As soon as feasible after preparation of the environmental document, the responsible official shall make the document available to the Council on Environmental Quality, Department of State, and other appropriate Federal agencies and other appropriate officials. The responsible official shall work with the Department of State to establish protocols for communicating with and making documents available to foreign nations and international organizations.

§ 6.1004 Special notice to foreign nations.

(a) *Toxic chemicals.* Section 12(b) of the Toxic Substances Control Act (TSCA) requires that exporters of chemical substances and mixtures for which submission of data is required under section 4 or 5(b) of TSCA shall notify EPA of the exportation or intent to export; EPA in turn is required to

notify the foreign nation of the availability of such data. Furthermore, the exporter of any chemical substance or mixture for which an order has been issued under section 5 of TSCA, a rule has been proposed or promulgated under section 5 or 6 of TSCA, or an action is pending or relief has been granted under section 5 or 7 of TSCA, shall notify EPA of such exportation or intent to export; EPA in turn shall notify the foreign nation of such rule, order, action or relief. The Assistant Administrator for Toxic Substances is responsible for carrying out these provisions.

(b) *Pesticides.* Section 17(b) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requires that EPA, through the State Department, notify foreign nations whenever a registration, or a cancellation or suspension of the registration of a pesticide becomes effective, or ceases to be effective. Also, under section 17(a)(2) of FIFRA for any unregistered pesticide, prior to export, the foreign purchaser is required to sign a statement acknowledging that the purchaser understands that such pesticide is not registered and cannot be sold in the United States. EPA, through the State Department, is responsible for transmitting a copy of the statement to the importing foreign nation. The Assistant Administrator for Toxic Substances is responsible for carrying out the provisions under section 17(b) of FIFRA. The Assistant Administrator for Enforcement is responsible for carrying out the provisions under section 17(a)(2) of FIFRA.

§ 6.1005 Lead or Cooperating Agency.

(a) *Lead Agency.* In accordance with 40 CFR 1501.5, Federal agencies involved in actions directly related to each other must take appropriate steps to create a lead agency. EPA shall to the fullest extent possible invoke these principles pertaining to lead agency.

(b) *Cooperating Agency.* Under section 2-4(d) of the Executive Order, Federal agencies with special expertise are encouraged to provide appropriate resources to the agency preparing environmental documents in order to avoid duplication of resources. EPA shall to the fullest extent possible invoke the principles of a cooperating agency under 40 CFR 1501.6 in working with the lead Federal agency. In those cases where other program commitments preclude the degree of involvement requested by the lead agency, the involved EPA official shall inform the lead agency in writing.

§ 6.1006 Exemptions.

Under section 2-5(c) of the Executive Order, Federal agencies may provide for exemptions from the prescribed environmental review and assessment requirements as may be necessary to meet emergency circumstances, situations involving exceptional foreign policy and national security sensitivities, and other such special circumstances. The responsible official, in consultation with the Director, Office of Environmental Review (OER), and the Director, Office of International Activities (OIA), shall obtain approval for such exemptions from the Administrator. The Department of State and the Council on Environmental Quality shall be consulted as soon as possible on the utilization of such exemptions.

§ 6.1007 Implementation.

(a) *Oversight.* OER is responsible for overseeing the implementation of these procedures and shall consult with OIA wherever appropriate. Except as otherwise provided above, OIA shall be utilized for making formal contacts with the Department of State. OER shall assist the responsible officials in carrying out their responsibilities under these procedures.

(b) *Information exchange.* EPA shall assist the Department of State and the Council on Environmental Quality in developing the informational exchange on environmental review activities with foreign nations. OER with the assistance of OIA shall undertake this activity.

(c) *Unidentified activities.* EPA program officials shall consult with OER and OIA to establish the type of environmental review or document appropriate for any new requirements imposed upon EPA by statute, international agreement or other agreement.

[FR Doc. 79-36692 Filed 11-29-79; 8:45 am]

BILLING CODE 6560-01-M